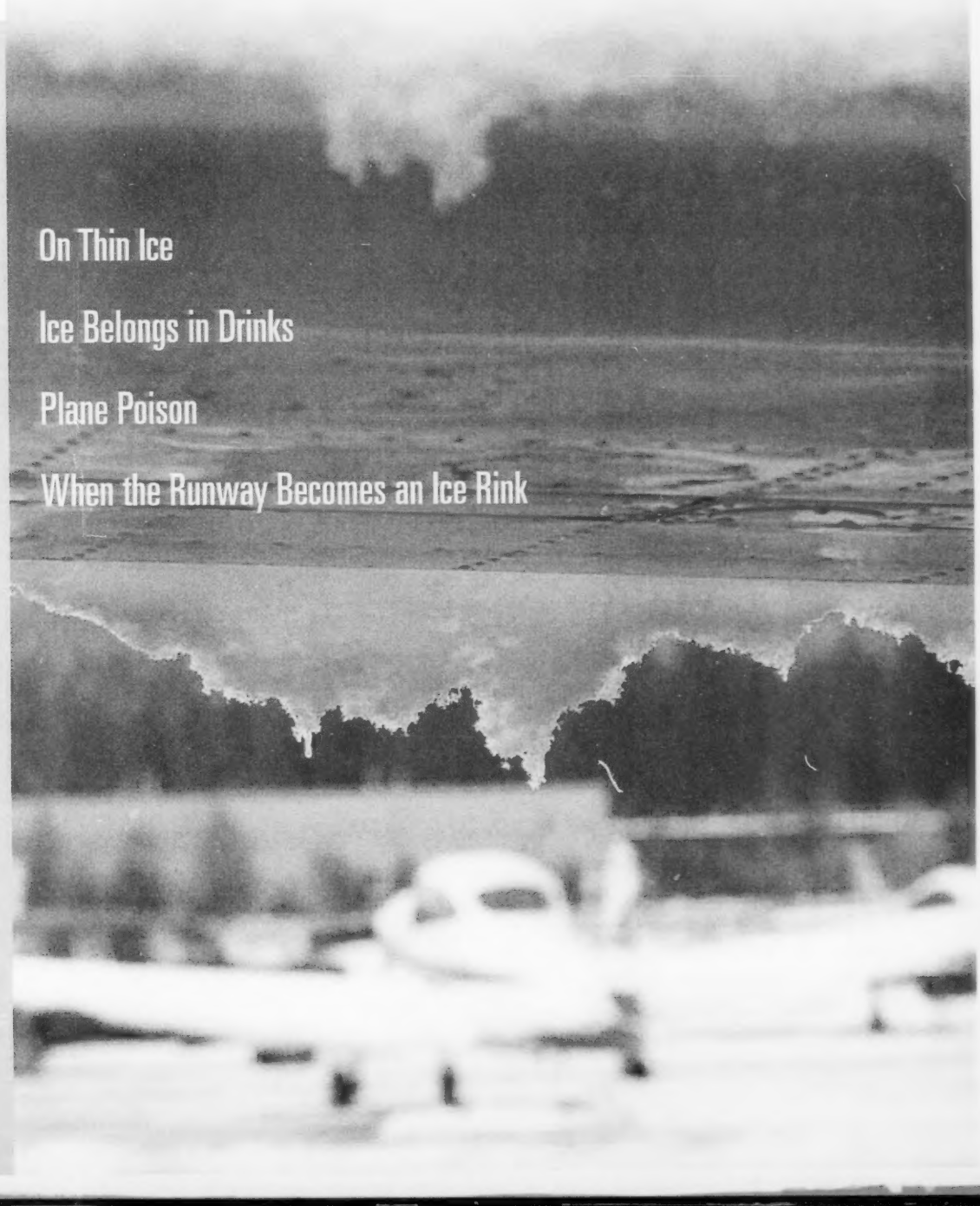
FAA Aviation News

SAFETY FIRST FOR GENERAL AVIATION

November/December 2009



On Thin Ice

Ice Belongs in Drinks

Plane Poison

When the Runway Becomes an Ice Rink

cover photo by H Dean Chamberlain

In this issue, we focus on winter flying safety, including icing avoidance strategies, safe operations on icy runways, and snow/frost contamination.

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JOHN M. ALLEN
DIRECTOR, FLIGHT STANDARDS SERVICE

Jumpseat

Keeping Current, Being Credible

I love to fly, and wish I could fly more. Flying is the most cathartic thing I do. While I fly the desk all too often, I stay current flying a Cessna *Citation* 560XL. (It has a distinctive N number—N2 or N3.)

Staying current is a priority for me since my organization oversees more than 6,000 operators, 5,000 repair stations, 600 training schools, 320,000 aircraft, and some 720,000 pilots and a similar number of licensed personnel, e.g., mechanics and ground instructors.

Staying current is essential to our safety mission—assuring the highest possible level of aviation safety and enabling the adventure, commerce, and service of aviation. In fact, we require all our operations aviation safety inspectors (ASI) to validate their flying proficiency before we hire them and then we require them to maintain their flying currency.

Keeping current is important for several reasons. First and foremost, since our inspectors oversee pilots and organizations that operate in the National Airspace System (NAS), it's essential they have the same knowledge and experience as the pilots and entities they oversee. Currency helps ASIs develop the judgment to determine whether an aircraft operator is working within regulatory requirements. Furthermore, as an inspector, I cannot imagine sitting down with an operator to talk about its operations without this expertise and experience.

Second, as new tools, such as Enhanced Flight Vision Systems, become more commonplace, it is important that we have hands-on experience using the new equipment in the NAS. This helps assure that we develop appropriate rules, standard procedures, restrictions, operational credit, training requirements, and maintenance requirements.

Third, we hire inspectors to specialize in specific aircraft types and they must maintain that expertise. An inspector responsible for overseeing charter and on-demand operators will need to stay current in *Falcons* and *Learjets*, for example. Or, another inspector, who oversees general aviation operations, must be current in gliders, rotorcraft, and representative GA single- and multi-engine airplanes.

I stay current flying a Cessna *Citation* 560XL.

And, as aircraft and the NAS become even more technologically advanced, it's imperative that we fly today's technologies in today's—and, more importantly, in tomorrow's—airspace.

Across our inspector workforce, we must be capable and proficient at all ends of the spectrum—from balloons to light-sport aircraft to turbine and jet aircraft. The need to be proficient in the most sophisticated aircraft is the primary reason the FAA Flight Program is acquiring six new Beechcraft *King Air* C-90GTi turboprop aircraft over the next two years. The first one is set to arrive before the end of the year. These airplanes feature an advanced, fully integrated Collins Pro Line 21™ avionics system usually found in larger jets. The *King Air* C-90GTi aircraft with the latest available technology is representative of modern GA and air carrier aircraft.

It is essential our aviation safety inspectors have the same knowledge and experience as the pilots and entities they oversee.

I am always looking forward to my next flight. For me, flying is not a right. It is a privilege and I hold myself to the same standard we have for our operations inspectors: Keep current and be proficient. I strongly believe that every pilot should have the discipline to avail themselves of flight instruction to maintain currency and proficiency in the aircraft they fly.

If you see me at an airport, please stop and say hello.

FAA Proposes Safety Enhancements to New York City Airspace

On September 16, 2009, FAA published a notice of proposed rulemaking (NPRM), which recommended several changes to modify the airspace over the Hudson River and establish standard procedures for aircraft operating along the Hudson and East rivers. The comment period was set to expire October 16, 2009, in order to facilitate chart publishing for November 19, 2009. The proposed changes, designed to create dedicated operating routes and procedures for all aircraft that fly at lower altitudes around Manhattan, were based on the recommendations of the New York VFR Airspace Task Force chartered on August 14, 2009.

The safety enhancements would restructure the airspace, mandate pilot operating rules, and standardize New York City-area charts. One of the most significant changes would divide the airspace into altitude corridors based on operational requirements of aircraft overflying the river from those operating to and from local heliports or seaplane bases.

The expedited process will also allow FAA to publish the changes on new, standardized aeronautical charts that would replace existing charts in November. As of press time, plans were underway for FAA to work with industry to develop training for pilots, air traffic controllers, and businesses that operate helicopters and airplanes in the area. Be sure to check FAASafety.gov for updates on training for the newly established Special Flight Rules Area (SFRA).

Exploring the Human Element of Maintenance Safety

In September, nearly 400 aviation industry executives, regulators, and maintenance personnel from around the world gathered at the annual FAA/Air Transport Association (ATA) Symposium on Human Factors in Maintenance and Ramp Safety. Discussion topics included human factors training programs, the continued integration of Aviation Safety Action Programs (ASAP) in maintenance, and fatigue-related studies for mechanics.

"We simply cannot ignore fatigue risks," stated FAA's Dr. Katrina Avers, who currently heads a multi-disciplinary workgroup dedicated to the study of systematic fatigue management. "Just two hours of sleep loss can affect performance and increase errors."

This fall, Dr. Avers is developing a maintenance fatigue newsletter that will be available at the Aircraft Maintenance Human Factors Web portal at: https://hfskyway.faa.gov. She also helped design the 2010 Fatigue Survival calendar designed especially for AMTs—see your local FAASTeam representative for a copy.

To view the symposium presentations, go to http://www.airlines.org/operationsandsafety/events/ and click the link for 2009 FAA/ATA Human Factors Symposium Presentations. Stay tuned for more on human factors in the January/February 2010 issue of *FAA Aviation News*.

Taxiing Toward Tomorrow: FAA International Runway Safety Summit

The FAA International Runway Safety Summit (IRSS) will be held December 1-3, 2009, at the Omni Shoreham Hotel in Washington, DC. This three-day event focuses on one of aviation's critical challenges — runway safety — and will feature discussions led by leading aviation safety experts and regulators.

"By bringing these individuals together, we will not only be able to evaluate our progress to improve runway safety to date, but also will set a course for the future of runway safety worldwide," said Wes Timmons, Director, FAA Office of Runway Safety.

Airport managers and planners, air traffic controllers, pilots, engineers, human factors

specialists, safety experts, airline officials, and aviation association executives should plan to attend this important runway safety conference. Everyone attending will come away with a better understanding and perspective of where runway safety is today and where it is headed. For more information, go to http://events.aaae.org/sites/091107/index.cfm.

Happy 100th Birthday!

Mark Twain wrote, "Age is an issue of mind over matter. If you don't mind, it doesn't matter." This is never more evident than for flight instructor and National Aviation Hall of Fame inductee Evelyn "Mama Bird" Johnson, who prepares to celebrate her 100th birthday on November 4 as a still-active member of the general aviation community.

With more than 50,000 hours of flight time, and some 5,000 students under her "wing" during her illustrious career, Evelyn Johnson has achieved more than most pilots and flight instructors would ever dream of accomplishing. But her drive and determination doesn't stop there. Johnson still works five days a week as manager of the Moore-Murrell Airport (KMOR) in Morristown, Tennessee.

In recognition of her milestone birthday, as well as her many decades of dedication to aviation, Johnson will be honored at the 2009 Tennessee Aviation Hall of Fame Gala on November 14, 2009. Happy birthday, Mama Bird!

FAA Issues InFO on Painting Pitot Tubes

FAA recently issued InFO 09012 (Information For Operators) on the potential for pitot-static system malfunctions after an aircraft is repainted. Aircraft are typically delivered with unpainted pitot tube(s) with the expectation the pitot tube(s) will remain as delivered. However, when an aircraft undergoes

November Is Aviation History Month

In November 1782, two French brothers experimented with trapping smoke and hot air in various types of bags. The end result: The invention of the Montgolfier hot air balloon and man's first flight. For this reason November is designated National Aviation History Month to commemorate man's efforts to touch the sky.

For those interested in the history of aviation and flight, special events are scheduled in aviation museums across the country. The only question is which museum do you visit? Of course, the Smithsonian's National Air and Space Museum is every aviation buff's ultimate goal, but if you do a search on the Internet, you will find aviation museums of every type, shape, or size across the United States. Individual states have their own museums—such as California, Illinois, Iowa, and Virginia—as do some cities.

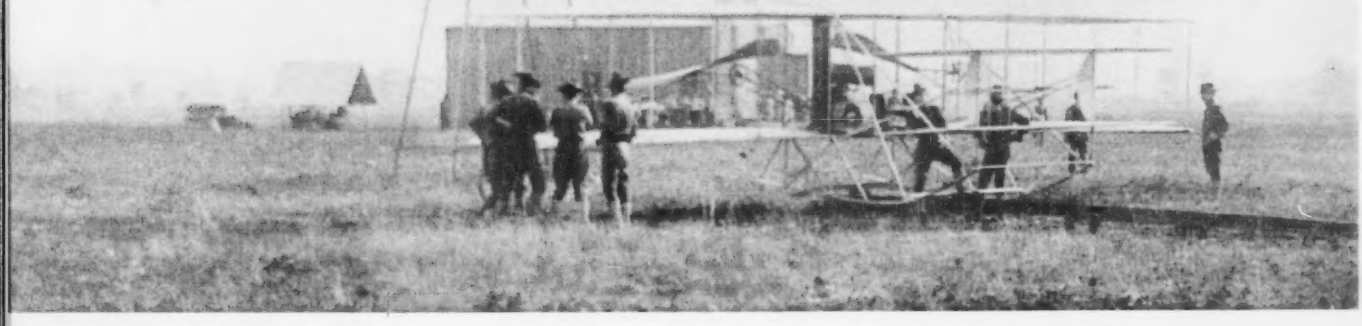
If military history interests you, you can visit:

- U.S. Army Aviation Museum in Ft. Rucker, Alabama, has the largest collection of military helicopters.
- National Museum of the U.S. Air Force at Wright-Patterson Air Force Base, Ohio, is the world's largest and oldest military aviation museum.
- National Naval Aviation Museum in Pensacola, Florida, covers the aviation history of the U.S. Navy, Marines, and Coast Guard.
- Flying Leatherneck Aviation Museum in San Diego, California, is currently in a temporary facility with plans for a larger complex in the future.

If an historic aircraft or person interests you, you can visit:

- Glenn H. Curtiss Museum in Hammondsport, New York, is dedicated to his memory and early aviation history.
- Piper Aviation Museum in Lock Haven, Pennsylvania, exhibits Piper Aircraft artifacts and memorabilia.
- Evergreen Aviation and Space Museum in McMinnville, Oregon, features Howard Hughes' famous Spruce Goose.

Nearly every state has at least one museum dedicated to aviation history, so in November celebrate the history of flight by visiting an aviation museum. Finding one is easy. Just search the Internet and, who knows, you may even find the Air Zoo of Kalamazoo, Michigan.



repair or gets a fresh coat of paint, maintenance personnel and/or painters may not realize the implications of applying paint on these critical components. Improperly applied paint can cause unreliable instrument readings or other hazards.

Individuals performing maintenance or preventive maintenance should be aware that applying paint to surfaces received unpainted from the manufacturer may be an alteration to the aircraft type design, requiring further evaluation. Persons engaged in repainting of aircraft and/or return to service of aircraft after painting should follow the manufacturers' recommendation concerning painting of pitot tubes and/or any other component delivered from the manufacturer unpainted. If uncertain, contact the manufacturer for information about a specific aircraft or component.

Remember to Cancel your VFR Flight Plans

Remember that you, the pilot, are responsible for ensuring that your VFR or DVFR flight plan is canceled (Ref: Title 14 Code of Federal Regulations section 91.153 (b)). Pilots should cancel a flight plan by contacting the nearest flight service station (FSS) on the radio or on the ground by calling 1-800-WX-BRIEF. Control towers do not automatically close VFR or DVFR flight plans since they do not know if a particular VFR aircraft is on a flight plan. If you fail to report or cancel within 30 minutes after your ETA, search and rescue procedures begin, which causes a needless expenditure of resources for an aircraft safely on the ground.

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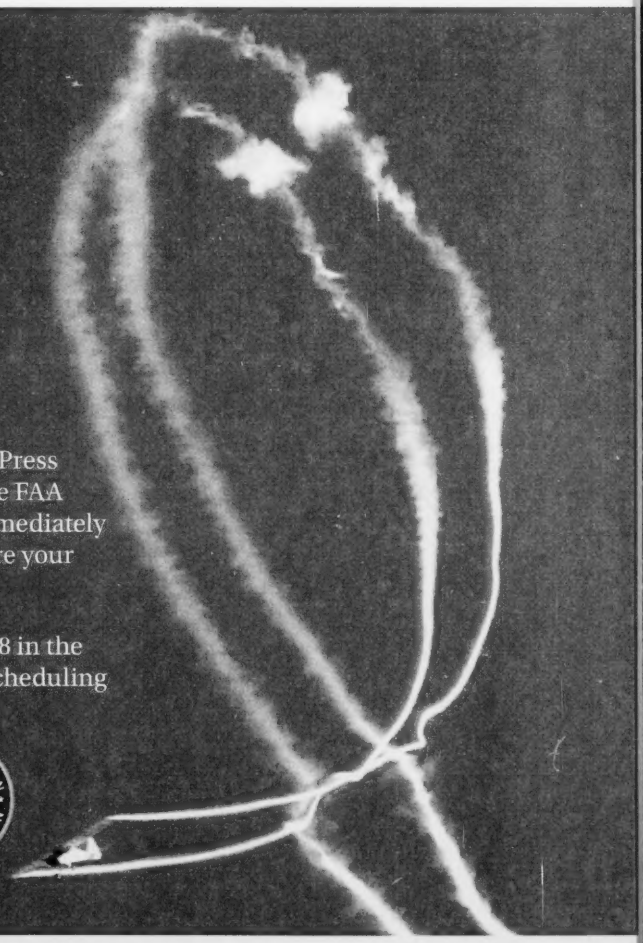
With FAA MedXPress, you can get your medical certificate faster than ever before.

Here's how: Before your appointment with your Aviation Medical Examiner (AME) simply go online to FAA MedXPress at https://medxpress.faa.gov/ and electronically complete FAA Form 8500-8. Information entered into MedXPress is immediately transmitted to the FAA and forwarded to your AME before your medical examination.

With this online form you can complete FAA Form 8500-8 in the privacy and comfort of your home and submit it before scheduling your appointment.

The new service is free and can be found at:

https://medxpress.faa.gov/



FREDERICK E. TILTON, M.D.
FAA FEDERAL AIR SURGEON

Aeromedical Advisory

Rhythm and Blues

Concerns about pilot fatigue have been in the news lately and, with the shorter days of winter fast approaching, it's a good time to review some basics about the human body's circadian rhythm and its impact on aviation safety.

Circadian Rhythm Disruption

Our circadian rhythm is an internal biological clock that regulates body functions based on our wake/sleep cycle. Clear patterns of brain-wave activity, hormone production, cell regeneration, and other biological activities are linked to these daily cycles. Scientists can't explain precisely how the brain "keeps time," but they do know that it relies on outside influences called zeitgebers (German for time givers). The most obvious zeitgeber is daylight.

CRD, Fatigue, and the Flight Environment

Any interruption of the normal circadian rhythm will have physiological and behavioral impacts, known as circadian rhythm disruption (CRD). Shift work, inherent in many aviation jobs, almost always causes CRD because the internal body clock is at odds with the shift schedule. Pilots suffering from CRD may experience difficulty falling and staying asleep, insomnia, daytime sleepiness, a general lack of energy in the morning, difficulty concentrating, oversleeping and trouble getting up, or increased negative moods.

The most debilitating symptom of CRD is fatigue, which is a dangerous condition for any pilot attempting to operate an aircraft. Some of the undesired effects include increased reaction time, decreased attention, impaired memory, and emotional irritability. These, in turn, can lead to increased frequency and severity of errors during aircraft operations, increased frequency of operational incidents, and (at a minimum) increased risk in aviation operations.

Resetting the Clock

If you have fallen victim to CRD, it is imperative to reset your biological clock. There are two key actions you can take to accelerate this process. First, expose yourself to as much daylight as possible, because bright light helps reset circadian rhythms. In addition, light has a direct and positive affect by increasing brain serotonin levels. Second, be active! When you arrive in a new time zone, taking a nap is the worst thing you can do because it sets your body's rhythms back to home time. Staying active on arrival will help your body adjust to the new time zone.

Bright light helps reset circadian rhythms.

Shift work almost always causes circadian rhythm disruption because the internal body clock is at odds with the shift schedule.

Do not let CRD-induced fatigue become a hindrance to aviation safety. For more information, take a look at the circadian rhythm information brochure at www.faa.gov/pilots/safety/pilotsafetybrochures/.

Good health and safe flying!

Dr. Tilton received both an M.S. and a M.D. degree from the University of New Mexico and an M.P.H. from the University of Texas. During a 26-year career with the U.S. Air Force, Dr. Tilton logged more than 4,000 hours as a command pilot and senior flight surgeon flying a variety of aircraft. He currently flies the Cessna Citation 560 XL.

PAUL PELLICANO

On Thin Ice:

A Little Frost Won't Hurt...*Or Will It?*

Photos by H Dean Chamberlain

It's a cold and clear winter weekend morning. Your airplane needs exercise. You don't have a lot of time—plenty of chores to do back home—but you are eager to oblige before the next round of winter storms keeps you both bound to the ground. You eagerly walk across the ramp, anticipating the freedom of the sky and the higher performance you expect in the colder and "thicker" winter air.

Uh-oh.

Your eye catches the glimmer of sunlight reflecting off your faithful flying machine, but you know that glint isn't coming from a clean or freshly waxed airplane. Rather, it is coming from sunlight shining on the layer of frost covering nearly every exposed surface of the airplane. As you draw closer, though, you see that the layer of "frosting" isn't terribly thick; in fact, the sun is already beginning to melt it away.

The ice may be thin, but the questions come thick and fast.

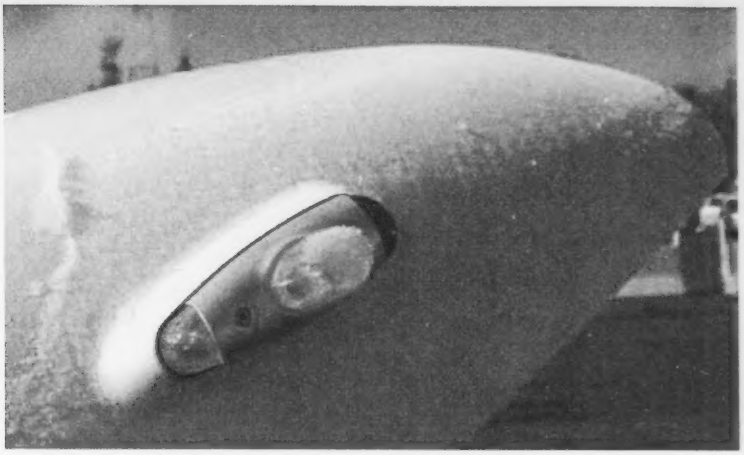
Where Does this Stuff Come from?

It didn't rain last night, and the morning is clear. How can there possibly be ice on your airplane? The answer is simple. When cold temperatures combine with any kind of visible moisture, some kind of ice contamination is likely. Here are some possible ways for ice to exist on an airplane parked in visual meteorological conditions:

- The airplane has residual ice from a previous flight in icing conditions.
- The airplane was exposed to snow, freezing drizzle, or freezing rain overnight.
- The airplane was exposed to active frost conditions overnight or is still in active frost conditions.

But, the Ambient Temperature Is above Freezing!

Yes, but ice contamination can still occur. Consider the example of an airplane sitting on the ramp through a clear, cold night. If the airplane's skin temperature is below freezing, and the air is humid enough, frost will form on the skin. Obviously, an outside air temperature below freezing can cause the skin temperature to be below freezing. But the skin temperature can also be colder than the air temperature. Remember from high school physics that the temperature of outer space is absolute zero. Radiant cooling to a clear nighttime sky can cause the skin temperature of your airplane to be colder than the air.



Are Some Airplanes More Susceptible?

All airplanes are susceptible to the effects of ground icing; however, smaller airplanes are generally more vulnerable than larger airplanes. High-wing airplanes account for two-thirds of general aviation icing takeoff accidents, perhaps because the upper wing is more difficult to see and reach on preflight. Pilots of high-wing airplanes should make sure they have the means, e.g., a stepladder, to access the upper wing during preflight when ground icing may be a factor.

How Much Harm Can a Little Frost Be?

Do not let your eagerness to fly lead you onto thin ice in your thinking. Many small-airplane pilots assume that the frost or ice contamination they see on the airplane is not significant enough to cause a problem. An examination of takeoff icing accidents involving small airplanes from 1982 to the present shows that, in most cases, the pilot did not de-ice the airplane before attempting to fly. In at least half of those accidents, the pilot knew about snow, ice, or frost contamination before takeoff, but did not remove it from the airplane.

Here are the cold hard facts:

- Certification of airplanes assumes that the airplane is free of ice contamination. There is no testing or analysis to demonstrate that a takeoff can be safely accomplished with contamination of any kind or amount.
- It only takes a little bit of frost or ice to do a lot of damage to your airplane and, quite possibly, to you and your passengers.
- Even small amounts of frost, ice, or snow contamination can impose large lift and drag penalties.
- Roughness similar to medium sandpaper on the wing's leading edge and upper surface can reduce maximum lift by as much as 30 percent and increase drag by 40 percent.
- Ice also increases the total weight.

To understand what this really means, think back to that basic "equation" you learned in ground school. For an airplane to remain in steady, unaccelerated flight, lift must equal weight and thrust must equal drag. Ice—even in small quantities—plays havoc with that balance. Ice reduces lift while it increases both weight and drag. In a typical light general aviation airplane, you are very unlikely to have sufficient thrust to overcome those penalties.

That's bad enough, but don't forget that ice contamination can also create control problems. Depending on where the aircraft was parked, one wing may be more contaminated than the other. This condition can lead to roll-control problems. Contamination on the tail can result in pitch-control problems.

Are All Surfaces Critical?

Pilots—especially those in a hurry—may be tempted to assume that some surfaces are aerodynamically more important than others. Before you fly off with ice adhering to some "non-critical" part of the airplane, remember that any amount of frozen contamination on any surface of a small airplane can result in a significant drag penalty. The safest approach is to clear the entire airplane of all frozen contamination. Don't forget the propeller: The blades are airfoils, and the ability to climb depends on their ability to generate thrust. Also, don't forget about engine inlets, pitot probes, static ports, and angle-of-attack or stall-warning sensors.

Do not let eagerness to fly lead you onto thin ice in your thinking.

What about Polishing Frost?

Pilots sometimes assume that the roughness associated with frost is the main problem, and that they can overcome it by smoothing, or "polishing," frost instead of removing it. This practice is a factor in about 15 percent of the small airplane takeoff icing accidents. Dispense with the idea that smooth or polished frost on lift-generating surfaces is an acceptable preflight condition. Instead, take the time to ensure that you clear all contaminants, including frost (polished or not), from wings and stabilizing or control surfaces. In addition to an aerodynamic penalty, the FAA has no data to

support practical guidance on determining how to polish frost on a surface to make it acceptably smooth, other than completely removing the frost. Subsequently, the FAA issued two Safety Alerts for Operators (SAFOs)—06002 and 06014— advising against the practice of polishing frost.

Do I Need to Do a Tactile (Touch) Check?

It is difficult to determine visually whether a wing is simply wet, or whether it has a thin film of ice. Also, ice accumulation on the wing upper surface may be difficult to detect from the cockpit, cabin, or front and back of the wing because it may be the same color as the wing. Don't forget to do a tactile check after de-icing, because you need to make sure that no ice or other contamination remains.

The safest approach is to clear the entire airplane of all frozen contamination.

What about Using Anti-Icing Fluid?

It depends. Consult your Airplane Flight Manual (AFM) or Pilot Operating Handbook (POH) for specific information on this topic. The AFM/POH information governs what you can and cannot do, but the following general guidance may be useful.

The key factor is rotation speed. If your airplane has a rotation speed of fewer than 60 knots, you should only consider Type I fluid. If the rotation speed is 60 knots or more, you can use Type III fluid, if approved by the airframe manufacturer. Only if your rotation speed is 110 knots or more, should you use Type II or IV fluid—and then only if approved by the airframe manufacturer.

Other than Type I (orange in color in North America and mostly glycol), you need positive authorization from the manufacturer to use Types II (clear or straw color, rarely used in North America), III (bright yellow color, not yet widely available in the United States), and IV (green). The Type II and IV fluids have thickening agents that may not flow off prior to takeoff on small airplanes, thus causing lift loss and large increases in the control force required to rotate. These thickened fluids may leave residue that, if not washed off, can rehydrate and refreeze at altitude and cause control difficulties.

Please note that all anti-icing fluids provide protection only for a limited time. For Type I fluids, this time is generally short (about five minutes, or less in some conditions). Always check just before takeoff to ensure that the fluid is still preventing contamination.

As for using any other fluids to de-ice your airplane, see the references at the end of the article for examples of fluids you can use.

Other Assumptions to Avoid

- Never assume that snow contamination will blow off during takeoff. Even if the snow does blow away, another problem arises if it is simply concealing a layer of ice.
- Don't think it's enough to clean just the leading edge of the wing or only around vortex generators. You need to clear all contaminants from the entire wing surface, including flaps and ailerons. Don't forget the horizontal tail and elevator.

The bottom line: Make sure your airplane is free of any and all ice contamination prior to takeoff in ground-icing conditions.

Paul Pellicano is an aerospace engineer in the FAA's Small Airplane Directorate and resides in Atlanta, Georgia.

For More Information

AOPA Air Safety Foundation's Safety Brief SB02-12/06 "Cold Facts: Wing Contamination" provides excellent advice on how to clean contamination off your airplane. This publication is available at:
http://www.aopa.org/asf/publications/safety_briefs.html

NASA has an on-line course titled "A Pilot's Guide to Ground Icing." This course is available at:
http://icebox-esn.grc.nasa.gov/education/products.html

Read FAA Safety Alerts for Operators (SAFO), including SAFOs 06002 and 06014 on ground de-icing and polished frost, at:
http://www.faa.gov/other_visit/aviation_industry/airline_operators/airline_safety/safo/all_safos/

Advisory Circular 91-74A, Pilot Guide: Flight in Icing Conditions is available at
http://www.faa.gov/regulations_policies/advisory_circulars/index.cfm/go/document.information/documentID/74471

Read FAA Information for Operators (InFO) 09016 on the effects of frost, snow, ice, or slush on the aircraft control and performance at:
http://www.faa.gov/other_visit/aviation_industry/airline_operators/airline_safety/info/all_infos/

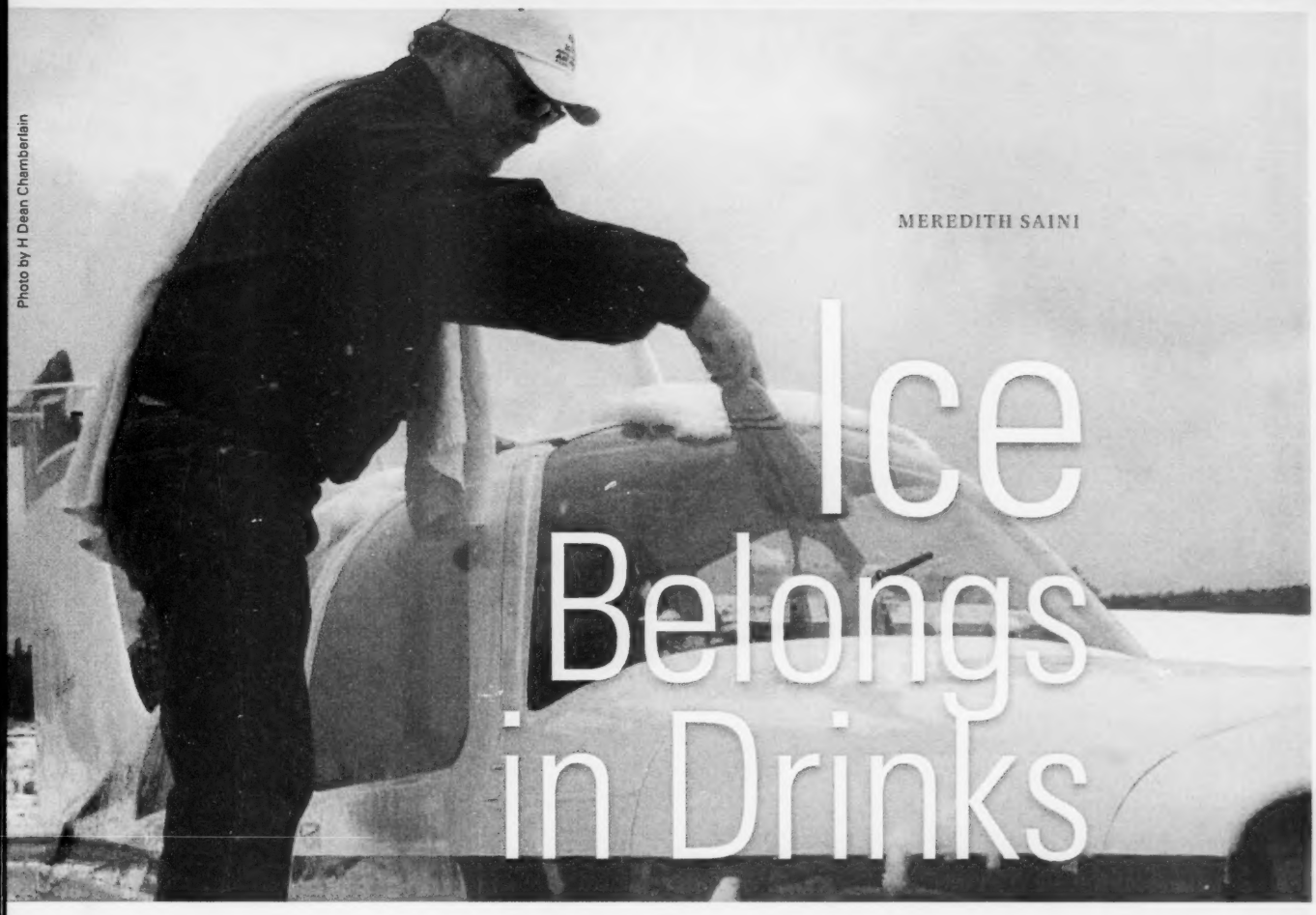


Photo by H Dean Chamberlain

MEREDITH SAINI

Ice Belongs in Drinks

Any pilot who's spent a drab winter day hangar flying at the airport over a pot of hot coffee with friends has probably heard stories like these before. There was the time when Joe took his *Bonanza* up to Boston to see a Celtics game and picked up a bunch of ice during the descent into Logan. He needed almost full power just to stay on the glide slope. Or when Bill's *Warrior* looked like a hockey rink after crossing the Appalachians on his way home from Thanksgiving dinner with the in-laws last year. His wife hasn't flown with him since.

These stories are often told with a touch of bravado, the pilot feeling a sense of accomplishment for having survived an ice encounter. "I got through it that time, so I'll probably be all right next time, too."

Nothing could be further from the truth for airplanes not certificated for flight in icing conditions, because the moment ice begins to accumulate on an airplane wing, that wing's shape morphs into some new, untested airfoil design. At that moment, you become the test pilot of a new airframe, with no guarantee that the wings will keep flying as long as they're covered with ice.

What Is Airframe Icing?

The *Aeronautical Information Manual* (AIM) describes the various types of airframe icing, the conditions under which it can form, and the negative effects it can have on airplane performance. It also offers guidance to pilots on how to give a pilot report (PIREP) on in-flight icing conditions. Depending on where the icing conditions are encountered and at what temperature and altitude, ice can form as clear ice, rime ice (cloudy appearance), or some combination of the two. Ice can form quickly, often in just a few minutes—the time it takes to climb or descend a few thousand feet through a layer of juicy clouds. Unless the aircraft is equipped with some kind of anti-icing or de-icing system, ice can accumulate rapidly on the leading edges of the wings, the horizontal and vertical stabilizers, propeller, and windscreen.

The moment ice begins to accumulate on an aircraft wing, that wing's shape morphs into some new, untested airfoil design.

The effects of ice on an aircraft are cumulative, and it doesn't take much at all to

severely reduce performance—as little as one-half inch of ice on an airfoil can reduce the lift it produces by up to 50 percent. Even a light coating of frost on the wings is enough to negatively affect the takeoff performance of most light airplanes.

Under what atmospheric conditions can a pilot expect ice to appear? As with many things in life, the answer is, it depends. There are many good tools on the Internet for making educated guesses about where ice is likely to be found, but there are no guarantees. AIM paragraph 7-2-21 says that a pilot can expect icing when flying in visible precipitation, such as rain or cloud droplets, and the outside air temperature is between +2 degrees and -10 degrees C. However, water can remain "super cooled" at temperatures as low as -40 degrees. Water can remain liquid at below-freezing temperatures until it contacts a solid surface like your airplane. Super-cooled large droplets, or SLD (which include freezing drizzle or freezing raindrops within or below clouds), are particularly dangerous because they can coat large areas of the wing and tail very quickly.

"Known icing conditions" are those where a reasonable pilot would expect a substantial likelihood of ice formation on the aircraft based upon all available information.

What Is "Known Icing?"

In 2003, the FAA defined "known icing conditions" as "atmospheric conditions in which the formation of ice is observed or detected in flight." This definition appears in paragraph 7-1-22 of the AIM. However, based in part on information provided by the Aircraft Owners and Pilots Association (AOPA), the FAA determined that this definition was not sufficiently broad enough to reflect the agency's current policy. The FAA issued an interpretation addressing known icing conditions and other aspects of flight in icing conditions on January 16, 2009.

In this interpretation the agency noted that "the formation of structural ice requires two elements: 1) the presence of visible moisture, and 2) an aircraft surface temperature at or below zero degrees Celsius. The FAA does not necessarily consider the mere presence of clouds (which may only contain ice crystals) or other forms of visible moisture at temperatures at or below freezing to be conducive to the formation of known ice or to constitute known icing conditions."

The letter to AOPA went on to say: "Most flight manuals and other related documents use the term 'known icing conditions' rather than 'known ice,' a similar concept that has a different regulatory effect. 'Known ice' involves the situation where ice formation is actually detected or observed. 'Known icing conditions' involve instead circumstances where a reasonable pilot would expect a substantial likelihood of ice formation on the aircraft based upon all information available to that pilot."

The letter acknowledged the challenge to pilots in deciphering the many possible weather scenarios that could lead to an icing encounter, but urged pilots to dig deeper than the area forecast to determine whether icing conditions might exist. The letter specifically advised pilots to obtain the latest surface observations, temperatures aloft, terminal area forecasts, AIRMETs, SIGMETs, and PIREPs. The letter also stated that pilots should incorporate new technology, as it becomes available, into their decision making.

The letter further noted that, "If the composite information indicates to a reasonable and prudent pilot that he or she will be operating the aircraft under conditions that will cause ice to adhere to the aircraft along the proposed route and altitude of flight, then known icing conditions likely exist."

Airplanes that meet certain design criteria can be certificated in the normal, utility, acrobatic, or commuter categories under Title 14 Code of Federal Regulations part 23 for "flight into known icing conditions." These aircraft are equipped with systems that not only prevent ice from forming on critical surfaces like the wings, tail, and propeller, but can shed ice that's already formed—within certain limitations. Such systems (often called Flight Into

Known Ice, or FIKI, systems) typically use pneumatic boots that expand and push the ice off, heating elements, a solution that is mechanically distributed over the surfaces, or some combination of these systems. Aircraft that do not meet these regulatory criteria can still be equipped with ice-protection systems (such as the TKS™ system that comes standard on the Cirrus SR22) but they are not legal to fly into known icing conditions.

Find Ice, Then Avoid It

There are several really good tools available on the Internet for sleuthing the potential for in-flight icing. NOAA's Aviation Digital Data Service has a fabulous Web site that pilots can use to supplement the official Flight Service preflight briefing. From the home page, click on the Icing tab to view graphical depictions of the latest icing advisories, pilot reports of icing, and forecast freezing levels.

Click on the Supplementary Icing Information link to see plots of where icing is predicted to be severe, including the forecast location and altitude where you are likely to encounter SLD. The Current Icing Product (CIP) uses input from weather sensors to produce an hourly snapshot of where ice is likely to be found right now. The Forecast Icing Potential (FIP) is an automatically-generated forecast of icing potential. FIP examines numerical weather prediction model output (from the Rapid Update Cycle, or RUC) to calculate the potential for in-flight aircraft icing conditions. This icing potential demonstrates the confidence that an atmospheric location, represented by a three-dimensional model grid box, will contain super-cooled liquid water that is likely to form ice on an aircraft.

RUC diagrams (also known as SkewT diagrams) provide another way to evaluate where ice might be found. The diagrams offer an easy way to figure out where the clouds are (and thus the potential for icing) in a given location, if you know what to look for. Go to http://rucsoundings.noaa.gov and in the form, type in the three-letter identifier for an airport along your route. Then, click the button that says "Simple java plots." If there are data available for that location, you will see a chart with a blue line (dew point) and a red line (temperature). The numbers on the right-hand vertical axis show pressure altitude in thousands of feet. The altitudes at which the blue and red lines come together are where you are most likely to find clouds—and if the temperature is below freezing at that altitude, there is a potential for ice to form. (You can find a NOAA article on RUC diagrams at: http://aviationweather.gov/general/pubs/front/docs/feb-04.pdf.)

If you are flying an aircraft that is not certificated for flight into known icing, you need to get out of the clouds at the very first sign of ice.

Photo by H Dean Chamberlain

Photo by H Dean Chamberlain

You're in Ice...Now, Get Out!

If you are flying an airplane that is not certificated for flight into known icing, you need to get out of the clouds at the very first sign of ice. Don't hesitate to tell ATC that you are picking up ice and need to exit the icing condition immediately. Declare an emergency if you are not able to maintain altitude. Above all else, don't rely on the autopilot. Fly the airplane!

The January 2009 interpretation reiterates that, "Pilots should not expose themselves or others to the risk associated with flying into conditions in which ice is likely to adhere to an aircraft. If ice is detected or observed along the route of flight, the pilot should have a viable exit strategy and immediately implement that strategy so that the flight may safely continue to its intended destination or terminate at an alternate landing facility. If icing is encountered by a pilot when operating an aircraft not approved or equipped for flight in known icing conditions, the FAA strongly encourages the submission of PIREPs and immediate requests to ATC for assistance."

Don't hesitate to tell ATC that you are picking up ice and need to exit the icing condition immediately.

Engage whatever equipment you have available to keep the situation from getting worse. Turn on the pitot heat if it's not on already. If you have an anti-icing system, such as TKS™, turn it on, too. Depending on how much ice has already accumulated, it might be too late for the fluid to have an effect. Be sure to note the time you turned on the system pump so you can keep track of fluid usage, as some systems only carry enough fluid for about a half an hour of continuous use. When flying at night in IMC in near-freezing conditions, carry a high-powered flashlight you can shine out onto the wings to check for ice accumulation.

Depending on where you are flying and your clearance from terrain and obstacles, descend to a lower altitude where temperatures might be above freezing. If you are picking up ice while skimming the tops of a cloud layer, climb a few hundred feet to get above the clouds, but only if you are positive there is clear air above and the airplane has climb capability. If you are wrong, you could end up spending more time in the clouds and accumulating even more ice. Maintain airspeed with ice on your airplane, and don't rely on your airplane's stall warning system.

When you do your preflight planning to avoid ice, you should also plan your exit strategies. Use all available resources to exit icing conditions as quickly and safely as you can. Ice belongs in drinks, not on airplanes.

Meredith Saini, a commercial pilot and flight instructor, is a contractor with the Flight Standards Service's General Aviation and Commercial Division.

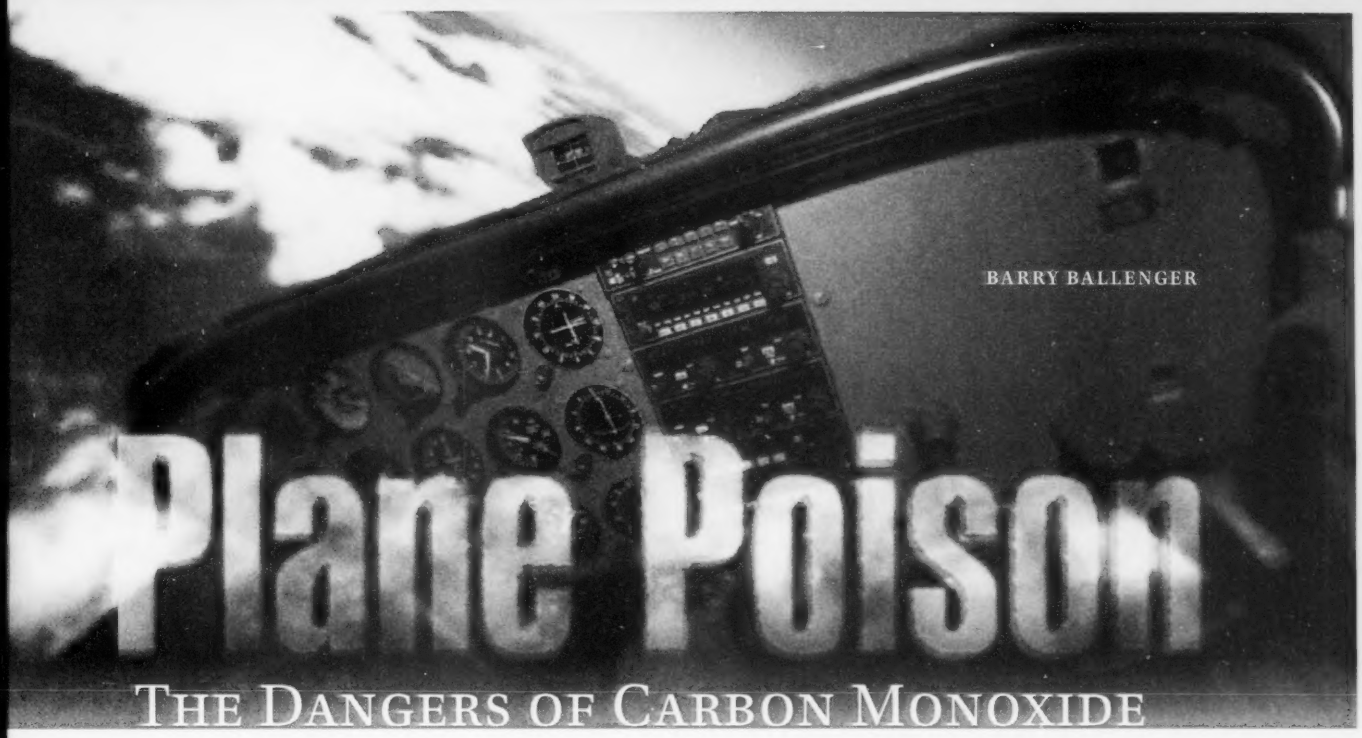
For More Information

NOAA Aviation Weather Center
http://aviationweather.gov

NOAA Aviation Digital Data Service
http://adds.aviationweather.noaa.gov/

SkewT Diagrams: New Tools For Vertical Analysis
http://aviationweather.gov/general/pubs/front/docs/feb-04.pdf

NASA computer-based training module (CBT): A Pilot's Guide to In-Flight Icing
http://aircrafticing.grc.nasa.gov/courses_inflight.html



BARRY BALLENGER

Plane Poison

The Dangers of Carbon Monoxide

Sometimes, the enemy lies within. Other articles in this issue of *FAA Aviation News* understandably focus on the dangers of icing before, during, and after a flight. For safety in winter-time flying, you also need to ensure that the environmental systems designed to keep you and your passengers from feeling the icy cold outside are in tip-top shape. Because most small airplanes use exhaust system heat for cabin heat and defrosting windshields, the integrity of these systems is crucial to preventing carbon monoxide (CO) poisoning.

Know your Heating System Cold

In a typical general aviation airplane, the design uses a heat exchanger or muff to collect heat from the exhaust system and pipe it to the cabin through flexible ducting. Consequently, leaks, improper connections, or damage to the exhaust system can permit carbon monoxide from engine combustion to enter the heat/defrost systems and the cabin. Carbon monoxide may also enter through the firewall if protective seals are improperly installed or deteriorated. Other entry points for carbon monoxide include wheel-well areas, windows, and fresh-air vents.

Know how your system works, and take a few extra minutes to look over the airplane's heating and defrost system during preflight. Look for signs of deterioration, such as cracked or distorted components, torn flexible ducting, or loose or missing hardware.

During flight, be on the alert for any suspicious smell, such as a burning or smoky smell. Carbon monoxide itself is odorless, but the burning or smoky smells can indicate exhaust system integrity issues. They may also provide early warning to the possibility of dangerous levels of carbon monoxide in the cockpit.

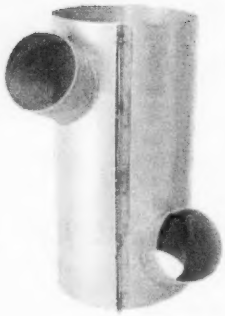
Burning or smoky smells can indicate exhaust system integrity issues.

A Few Pounds of Prevention

Certification regulations limit the level of carbon monoxide to 1 in 20,000 parts (0.005%) of air in the passenger compartment. If you own your own airplane, you may want to consider installing a carbon monoxide detector to monitor CO levels. Installing a carbon monoxide detector that meets the specifications of TSO-C48 (technical standard order) is relatively simple, as it is considered "non-essential equipment." These detectors give both an aural and visual indication when excessive carbon monoxide levels are present.

Know how your system works, and be alert for signs of deterioration, such as cracked or distorted components, torn flexible ducting, or loose or missing hardware.

Reasonably priced carbon monoxide detectors are also available for maintenance technicians to measure carbon monoxide levels. Measuring the carbon monoxide level is the best method to ensure dangerous exhaust gases are



Examples of a general aviation muffler (l) and a muffler shroud (r)

not entering the passenger area. Measurements should be taken during taxi and flight to ensure that the levels remain safe any time the engine is running.

Working with your AMT

When your airplane is inspected, consider talking to the aviation maintenance technician (AMT) to get a better understanding of your airplane's exhaust and environmental systems. An AMT will inspect all exhaust system components for condition and will give particular attention to areas associated with cabin heat and defrost systems. He or she will also look for deformation, corrosion, erosion, cracks, burned spots, and loose or missing hardware. Heat muffs should be removed to inspect the condition of the exhaust system hidden by their installation. An AMT will look for signs of exhaust leakage, such as powdery deposits or stains, and replace any defective parts.

For safety in winter-time flying, you need to ensure that the systems designed to keep you and your passengers from feeling the icy cold outside are in tip-top shape.

Another key area for the AMT is inspection for non-approved repairs to exhaust components. Many exhaust system components are not field repairable, so signs of any exhaust system repair without proper documentation provide cause for concern. The AMT will inspect the firewall for condition and security of all pass-through locations, such as electrical or plumbing, engine controls, and steering controls. The AMT will ensure that the pass-through sealant or seals are in serviceable condition, and that they will not allow exhaust gases into the cabin area. Finally, door and window seals should be checked for condition and security.

Because most small airplanes use exhaust system heat for cabin heat and defrosting windshields, the integrity of these systems is crucial to preventing carbon monoxide poisoning.

Pressure Testing

FAA airworthiness directives on exhaust systems include mandatory pressure checks to detect unsafe conditions. Pressure testing exhaust systems is highly encouraged as a preferred method of assessing the integrity of exhaust systems and their components. Consequently, you might consider specifically asking the AMT to pressure test your airplane's exhaust system components when troubleshooting or during routine inspections. By using low air pressure (2-10 psi) and plugging all exhaust system openings, the exhaust system integrity is easily checked. Individual components can be submerged in water to check for evidence of leaks. In-situ exhaust system components can be checked using soapy water to detect leakage.

Everyone Plays a Role

Safety is, and always will be, a team effort. It is the AMT's responsibility to ensure the airworthiness of any engine installation when conducting annual or 100-hour inspections or when conducting maintenance. Remember, though, that it is the pilot's responsibility to ensure that the aircraft is airworthy and in a safe condition for flight. Taking a few extra minutes to preflight exhaust system components may save your life.

Barry Ballenger is an aerospace engineer with the FAA Small Airplane Directorate in Kansas City, Missouri. He holds an A&P with Inspection Authorization and is a private pilot.

For More Information

An article that illustrates what carbon monoxide can do to a pilot:
www.pilotfriend.com/aeromed/medical/uncon_landing.htm

FAA Advisory Circular 91-59A, Inspection and Care of General Aviation Aircraft Exhaust Systems
http://rgl.faa.gov/Regulatory_and_Guidance_Library/rgAdvisoryCircular.nsf/list/AC%2091-59A/$FILE/AC%2091-59A.pdf

FAA Special Airworthiness Information Bulletin CE-04-22, on the importance of maintaining and inspecting exhaust system components
http://rgl.faa.gov/Regulatory_and_Guidance_Library/rgSAIB.nsf/2d69931bd1dab16b8625722500705891/1ab679bfe64f1b188625721f0052ebf1/$FILE/CE-04-22.pdf

MEREDITH SAINI

When the Runway Becomes an Ice Rink

Photo by James Williams

Imagine that you are preparing to fly your Cessna 182RG from your home airport in Gaithersburg, Maryland (KGAI), to Westchester County Airport in White Plains, New York (KHPN). It's a raw, high-overcast winter morning in Maryland, with above-freezing surface temperatures. No precipitation has fallen since a light dusting of snow the previous day, and it has since melted. However, the area forecast calls for IFR ceilings and snow along the route, with a chance of snow turning to freezing rain at the destination within a few hours of your planned arrival time.

Being the careful pilot that you are, you delay your departure until the ceilings have lifted and the precipitation has stopped, keeping you clear of clouds and any risk of in-flight icing.

The flight proceeds uneventfully and 30 minutes from your anticipated arrival at White Plains, you dial in the ATIS and learn that the surface winds are from 130 degrees at 15 gusting to 20 knots, visibility is 10 miles, and the ceiling is 8,000 feet broken. The surface temperature is -2 degrees C. The ATIS concludes with the statement, "Braking action advisories are in effect." You've never heard this on an ATIS report before, but the weather is acceptable. You continue to the airport and plan to land on Runway 11, which is 4,451 feet long and 150 feet wide. Runway 16 is 6,548 feet long and 150 feet wide, and is the preferred runway for the airport's numerous business jets and airliners.

When you call the tower 15 miles out, the controller advises you that a *Challenger* just landed on Runway 16 and reported braking action as "poor" due to accumulated snow and slush from a heavy squall that passed through the area a short while ago. It has not yet been treated by the ground crew. You were not aware of this because you do not have any onboard weather information, and you have not consulted Flight Watch to update the briefing you received prior to departure. The tower controller asks you to state your intentions.

With a report of poor braking action, you would be well advised to divert to an alternate airport where the runways and taxiways are clear and there are no reports of adverse surface conditions.

What should you do?

Photo by H Dean Chamberlain

Braking Action Advisories

The *Aeronautical Information Manual* (AIM) contains guidance (Chapter 4) for pilots on the meaning of braking action reports and advisories. "When available, ATC furnishes pilots the quality of braking action received from pilots or airport management. The quality of braking action is described by the terms 'good,' 'fair,' 'poor,' and 'nil,' or a combination of these terms." The AIM urges pilots to provide as much detail as possible about the conditions they experience during landing, including where on the runway braking was least effective.

The ATIS report will include a braking action advisory when pilots describe braking action as "poor" or "nil," or whenever conditions are conducive to deteriorating or rapidly changing braking conditions. During the time that braking action advisories are in effect, ATC will issue the latest report to each arriving or departing aircraft. The AIM suggests that pilots should be prepared for deteriorating braking conditions and should request information on current conditions from ATC if it is not offered.

In our example, with a report of poor braking action on the runway, you would be well advised to divert to an alternate airport where the runways and taxiways are clear and there are no reports of adverse surface conditions. But if you must land at White Plains for whatever reason, e.g., no good alternate available, low on fuel, and/or deteriorating weather, consider landing on Runway 16. Runway 16 presents a stronger crosswind component, but it is 2,000 feet longer than Runway 11. It's a good idea to double or even triple your airplane's published landing distance when the runway is slick, and aim to touch down on the upwind side of the runway as close to the numbers as you can.

The best way to reduce the risk of losing control on a winter-wet runway or taxiway is to avoid operating on slick surfaces.

What to Do If You Slide

Advisory Circular 150/5200-30C, Airport Winter Safety and Operations, offers insight into how slick runway surfaces can affect aircraft performance:

> "Snow, slush, ice, and standing water on a runway impede airplane acceleration by absorbing energy in compaction and displacement, and by impinging on parts of the airplane after being kicked up by the tires. For airplanes decelerating, slush, snow, and standing water-covered pavements and, especially iced surfaces, hamper deceleration rates due to a reduction in the friction coefficient of the runway and the potential for hydroplaning. Large chunks of ice, from refreezing snow or slush, or deposited from aircraft gear during landings, can cause severe damage to tires, engines, and airframes. Wet snow, slush, and standing water on a runway can also limit operations due to potential structural damage caused by the contaminants impinging on the airplane at high speed."

Given all of that, the best thing you can do if you realize you've encountered slick runway conditions is to reduce power to decelerate and avoid braking—the same response you should have when driving your car. Use all available flight controls (including flaps) to maintain directional control throughout the landing rollout. Do not rely only on nose-wheel steering and differential brakes to maintain control. If a crosswind exists, apply whatever aileron and elevator inputs are necessary to keep the airplane from sliding off the runway during the landing rollout, though if the wind is strong enough or if you encounter ice, this advice may prove impossible to follow. Do whatever you can to maintain aircraft control until you are safely shut down on the ramp.

Assuming you are able to decelerate safely on the runway after landing, taxiing to the ramp may

pose an even greater challenge. If you're flying a low-winged light airplane, pay extra attention to the height of snow banks. If you slide and get too close to the edge of the taxiway during a turn, your wingtip could impact a snow bank. The challenge is to taxi fast enough to avoid stopping and potentially getting stuck in the snow or slush, but slow enough to maintain directional control with minimal braking.

Other Flight Considerations

When runways and taxiways are covered in snow, it can be difficult for a pilot to identify them during a visual approach. One might look like the other, or grass medians might be confused with paved surfaces. If you are instrument rated, it's a good idea to ask for a precision approach to the landing runway to confirm where the wheels are supposed to go. If you are not instrument rated, consider asking a flight instructor to show you how to tune and use a localizer frequency or how to program a GPS approach with vectors to final. This technique will provide you with straight-in course guidance to the landing runway, which you can use to confirm what you see out the window.

Planning Is the Best Prevention

The best thing you can do to reduce the risk of losing control of your aircraft on a winter-wet runway or taxiway is to avoid operating on slick surfaces. Some pilots use the half-inch rule of thumb for making go/no-go decisions for landing on slush- or snow-covered runways. To do this, you need information about where these conditions are likely to exist. A thorough preflight briefing should include any *Notices to Airmen* (NOTAM) about runway or taxiway closures, snow and ice removal operations in progress, pilot reports (PIREP) of braking action, and, of course, current and forecast weather conditions.

Ice, slush, and snow can turn your aircraft into a sled. Unless your airplane is equipped with skis, it is simply not designed to operate effectively on slippery surfaces. So when the runway glistens, lace up your ice skates—and leave the airplane in the hangar.

Meredith Saini, a commercial pilot and flight instructor, is a contractor with the Flight Standards Service's General Aviation and Commercial Division.

National Transportation Safety Board Accident Report

Learjet Runway Overrun. On January 28, 2005, a *Learjet* 35A sustained substantial damage during a landing overrun on Runway 19 at Charles B. Wheeler Downtown Airport (KMKC) in Kansas City, Missouri. The airplane was operated by a commercial operator as a positioning flight to Kansas City International Airport (KMCI) in Kansas City, Missouri, with a filed alternate destination of Lincoln Airport (KLNK) in Lincoln, Nebraska. Night instrument meteorological conditions prevailed at the time of the accident.

The flight was en route to KMCI to pick up passengers and continue on as an on-demand charter but diverted to KMKC following the closure of KMCI. KMCI was closed due to a McDonnell Douglas MD83 sliding off a taxiway during an after landing taxi on contaminated runway and taxiway conditions.

Following a precision approach and landing on Runway 19 at KMKC, the *Learjet* 35A slid off the departure end of the runway and impacted airport property and terrain. The jet was operated with inoperative thrust reversers as was allowable by its minimum equipment list.

About an hour before the accident, Runway 19 was reported as being covered with a half inch of wet snow. About 17 minutes before the accident, KMKC began snow removal operations. About 7 minutes before the accident, the KMKC tower instructed the snow removal vehicles to clear the runway for inbound traffic. The tower was advised by airport personnel that Runway 19 was plowed and surface conditions were one-quarter inch of snow.

While inbound, the *Learjet* 35A requested any braking action reports from the tower. The first airplane to land was a Cessna 210 *Centurion,* and the pilot reported braking action to the tower as "moderate," which was then transmitted by the tower as "fair" from a *Centurion* in response to the *Learjet* 35A's query. The Cessna 210 *Centurion* pilot did not use brakes during landing and did not indicate this to ATC during his braking action report.

The *Learjet* 35A crew calculated a landing distance of 5,400 feet. Runway 19 was 7,002 feet long by 150 feet wide, grooved asphalt.

The National Transportation Safety Board determined the probable cause of the accident as the contaminated runway conditions during landing. Contributing factors were the operation of the airplane without thrust reversers, flight to the planned alternate airport not performed by the crew, and the insufficient runway information. Additional factors were the airport property and terrain that the airplane impacted.

SUSAN PARSON

Checklist

Not Carved in Stone

No one ever claimed that the rulemaking process moves too quickly. The most recent changes to Title 14 Code of Federal Regulations (14 CFR) parts 61, 91, and 141 (Pilot, Flight Instructor, and Pilot Certification) took effect on October 20, 2009, but they were years in the making. As some of my colleagues can attest, the last few months of the process were especially painful.

Although many people might sometimes express the wish for a "more efficient" (read: quicker) rulemaking process, we all benefit from the fact that it provides—indeed, requires—ample time for public review and comment. If you think that comments don't count, all you need to do is scan through the new rule, which is available online at http://edocket.access.gpo.gov/2009/pdf/E9-19353.pdf. Most of the rule's 73 pages contain a summarization of the comments submitted in response to the original Notice of Proposed Rulemaking (NPRM) and descriptions of how FAA addressed them. In cases where FAA disagreed, the agency has an obligation to explain why.

Change may not come as quickly as we would like, but it *does* come.

A Living Document

Some argue that the rulemaking process is too slow to accommodate the pace of change in the technologically dynamic aviation industry. Change may not come as quickly as we would like, but it does come. For proof that part 61 is a living and changing document, you need only look at the NPRM published days after the Pilot, Flight Instructor, and Pilot Certification final rule appeared in the *Federal Register*. Like the final rule, the latest NPRM, Pilot-in-Command Proficiency Check and Other Changes to the Pilot and Pilot School Certification Rules, would alter provisions of 14 CFR parts 61, 91, and 141. Some of the proposed changes are specifically intended to bring the regulations in line with today's aviation realities. Here are just a few examples.

Some of the proposed changes are specifically intended to bring the regulations in line with today's aviation realities.

What Might Change

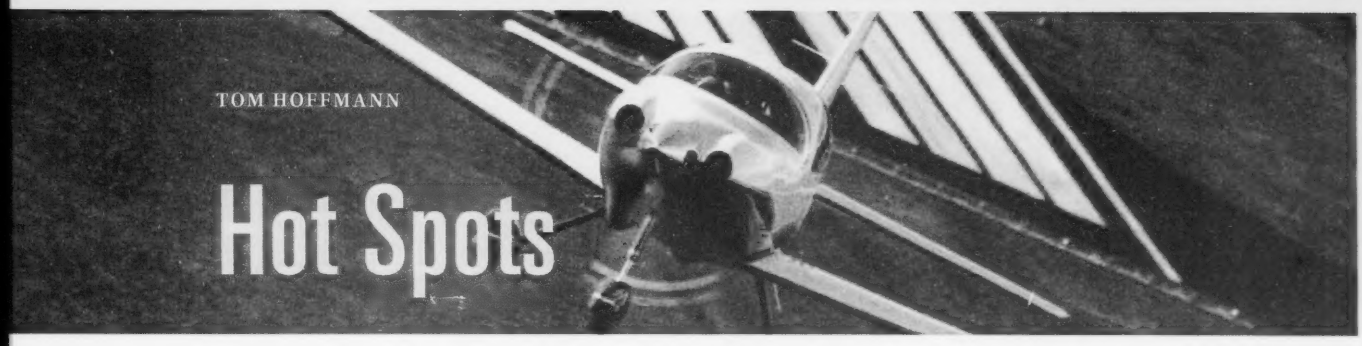
The flight training community has long argued that FAA's definition of "complex" airplane is outdated. Consequently, the NPRM includes a proposal to revise the definition (now in 14 CFR section 61.31(e)) to include airplanes equipped with a full authority digital engine control (FADEC) and move it to 14 CFR section 61.1(b)(3).

Another interesting proposal is to replace the 10 hours of complex airplane experience now required for a commercial pilot certificate with a single or multi-engine category rating (14 CFR section 61.129(a)(3)(ii)) with 10 hours of advanced instrument training. The advanced instrument training must include instrument approaches consisting of both precision and non-precision approaches; holding at navigational radio stations, intersections, waypoints; and cross-country flying that involves performing takeoff, area departure, en route, area arrival, approach, and missed approach phases of flight. The NPRM notes that in today's environment, FAA considers the advanced instrument training to be more beneficial.

What Do *You* Think?

The rulemaking docket for these and the many other NPRM proposals will be open for public comment until November 30, 2009. To read the document in its entirety—or just check the summary table of proposed changes—go to http://edocket.access.gpo.gov/2009/pdf/E9-20957.pdf. The document also includes instructions on how to make your voice heard. Don't miss out!

Susan Parson is a special assistant in the FAA's Flight Standards Service. She is an active general aviation pilot and flight instructor.



TOM HOFFMANN

Hot Spots

Winter Safety—What's your Position?

With skis waxed and ready to hit the slopes, many pilots look forward to a winter fly-in ski trip. Whether snow-bound for your dream ski vacation, or just headed to any cold and snowy destination, there are some hot items you'll need to check before your flight. In particular is the importance of position reporting on the Common Traffic Advisory Frequency (CTAF) when landing at night after the tower is closed, especially during snow removal operations.

Surprise!

Last winter, two pilot deviations occurred at the same airport when pilots failed to state their intentions and position over the radio during snowy conditions. The first event involved a single-engine pilot who, after being cleared for an IFR approach by the Air Route Traffic Control Center (ARTCC), was told to contact tower at the final approach fix. The pilot forgot to do so until he was over the numbers and touching down. He took off immediately after discovering a horde of busy snowplows at the far end of the runway.

The second case involved a commercial crew who arrived at the airport after the tower closed. After breaking out of the clouds, the crew continued the approach but did not report position or intention to land. Once over the numbers, the pilots made a startling discovery of snowplows working directly in front of them, which forced an immediate go-around. Both cases ultimately resulted in a safe outcome, but the pilots' actions, or in these cases, inaction, could have proved disastrous.

"One of the most common complaints we get from airport operators about winter operations," says FAA Runway Safety Program Manager Mike Meigs, "is pilots failing to announce intentions to land on the CTAF after the tower is closed."

At many northern airport locations, the weather is such that snow removal happens before the tower opens in the morning and after the tower closes at night. Airports issue NOTAMs about snow removal, and most have someone who announces periodically on the CTAF that snowplows and other equipment are on the runway.

Despite these precautions, pilots often come in to land without announcing their intentions on the CTAF. "Position reporting," Meigs adds, "alerts personnel of your intentions and enhances the level of safety surrounding runway occupancy."

Once over the numbers, the pilots made a startling discovery of snowplows working directly in front of them.

Proper Planning = Prevention

Pilots should also note that at many airports with operating towers, local ATC does not always have access to radar information and depends on pilot position reports to manage departure and arrival flows. These position reports become

Winter Runway Safety Tips

- Maintain situational awareness. Signs, markings, and lighting on airport grounds can be difficult or even impossible to see during wintry conditions.
- Stay vigilant of all surface traffic, especially when visibility is poor. Other aircraft or vehicles may have trouble seeing you and may have impaired braking ability.
- Study the airport diagram and anticipate what actions to take if you miss your turn-off during outbound taxi or after landing.
- Ensure that side panels and the windshield on your aircraft are free of all ice, snow, and dirt to maximize visibility.
- Not sure about something? Ask ATC for assistance and remember that progressive taxi instructions always are available.

Photo by James Williams

especially crucial during snow removal operations, which are frequently conducted between arriving aircraft. The reports alert ATC of the time needed to clear the active runway(s) for arrivals. Failure to make these reports can lead to abrupt actions by controllers, ground personnel on the runway, and other pilots; and can compromise safety for all.

The best prevention is good preflight planning. Before your flight, check for NOTAMs about snow removal operations at your destination airport, as well as any possible alternates. If available en route, check with Flight Service for any changes to NOTAMs in your area, or call Flight Watch for any PIREPs that may indicate an unexpected change in snow removal operations.

Position reports become especially crucial during snow removal, which is frequently conducted between arriving aircraft.

Also, make sure you know the hours of operation of towered airports and abide by any ATC requests for position reporting. If using a non-towered airport, or if the tower at your destination is closed, announce your intentions to land, take off, or taxi on the CTAF. Be sure to listen for other traffic and for any announcements made by airport personnel regarding snow removal.

Winter flying can be exhilarating and can open doors to exciting new experiences. Taking the precautions outlined here will help get you to your winter destination safely, perhaps even to "catch some more air" on the slopes.

Tom Hoffmann is associate editor of FAA Aviation News. *He is a commercial pilot and holds an A&P certificate.*

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TOM HOFFMANN

Acronym Soup

AMAFAS!

ACRONYMS MAKE AVIATION FUN AND SAFE !!!

Imagine waking up to read the morning paper and seeing this headline: "DOE to do NEPA's EIS on BNFL's AMWTP at INEEL after SRA protest." It might make you want to go back to bed. This actual headline, from the *Idaho Mountain Express,* shows how efforts to simplify and condense communications can sometimes wind up being seriously counterproductive.

Let's face it: Acronyms and abbreviations are a part of everyday life. For many industries, especially aviation, "acronym speak" has evolved into a language of its own. But despite their pervasiveness in all things aviation, along with their occasional quirky (and sometimes humorous) letter combinations, acronyms and abbreviations are a big part of what keeps aviation efficient, fun, and most importantly, safe.

The Alpha of Acronyms

Abbreviations in language have existed for centuries. The need to shorten complex terms went hand in hand with the skyrocketing progression of science and technology, particularly in the last hundred years. Words shortened by a string of first letter initials became known as initialisms, such as FAA. In 1943, someone coined the term "acronym" to describe abbreviations that could be pronounced as words: For example, "scuba" for self-contained underwater breathing apparatus. Arguments persist over the distinction between acronyms and initialisms, but "acronym" is now widely used to describe any abbreviation formed from initial letters.

As most pilots can attest, the proliferation of acronym use in aviation has significantly changed the way we communicate. Unlike in written communication, where the writer is responsible for defining acronyms, aviators generally own the task of knowing these time-saving abbreviations up front. Learning a new language of distinct letter combinations may take some time initially, but it can pay dividends in the brevity and clarity of your communications.

Without acronyms, communication during a flight could easily become cluttered and chaotic. Just imagine asking air traffic control (ATC) for vectors to shoot a Very high frequency Omnidirectional Range approach co-located with Distance Measuring Equipment (VOR/DME). Even this publication's news roundup department—ATIS—could be cumbersome, and perhaps confusing, if it were titled Automated Terminal Information Service. By choosing ATIS, a term synonymous with local airport information, the title resonates more directly with a pilot audience on where to go for news updates.

FYI

Sometimes we use acronyms so much in our daily conversations that we overlook what the letters actually stand for. For instance, most of us know what the acronym TNT means, but how many of us know this explosive material stands for the word trinitrotoluene? Not many, I suspect (myself included). And, would that information give Wile E. Coyote any advantages to catching the roadrunner? Probably not, just as not knowing what the letters RSVP (Répondez s'il vous plaît) stand for prevent us from using it on wedding invitations.

We can also forget what acronym letters stand for when they start becoming well-used as words, e.g., laser and radar. A top contender for this phenomenon in aviation would be the acronym FOD (Foreign Object Debris). Every pilot learns the importance of FOD during training. FOD awareness becomes so second nature that it is easy to think of it as a word without regard for what the letters stand for.

According to FAA Human Factors Engineering Psychologist Dr. Roni Prinzo, repeated use of an

acronym can start a natural progression towards treating it as a word in and of itself. While not necessarily a bad thing, Dr. Prinzo points out how important it is for the person, or in this case, the pilot, "to use standard aviation phraseology and fully understand what the acronym is, along with the concept, device, or procedure it stands for." Dr. Prinzo, who has authored several reports on controller/pilot communication, urges pilots to "make no assumptions on instructions received from ATC. If an unfamiliar term or abbreviation is used, have it restated for clarity."

Roger, Roger. What's our Vector, Victor?

The issue of proper distinction becomes even more critical when you have duplicate acronyms that take on different meanings. They don't occur often, but they may take you by surprise. Take LDA, for example. Are you referring to a Localizer-type Direction Aid, or Landing Distance Available? Or, how about STARS? It can have several meanings in aviation, including Standard Terminal Arrival Route, Standard Terminal Area Radar System, or even a Standard Terminal Automation Replacement System. Understanding the difference of these duplicate acronyms, the context they are used in, as well as the fact others may not know the difference (your co-pilot or ATC) are crucial factors in making sure your intentions are understood correctly.

Acronyms can save time, improve efficiency, and add fun to the process of description.

The following accident, involving a Cessna 172 on a flight from Pennsylvania to Florida, underscores the grave consequences of this type of miscommunication. The pilot was relatively inexperienced and became disoriented due to encroaching inclement weather. Low on fuel and below VFR minimums, the pilot requested assistance from ATC to help locate the nearest favorable airport to land. The pilot proceeded to get vectors for an NDB approach to Cumberland Airport in West Virginia. But when the pilot reported "having the beacon," ATC understood this to mean he had the airport beacon instead of the NDB, and issued a direct heading to the airport. Still confused, the pilot flew past the field, losing gallons of precious fuel, until fuel exhaustion forced a fatal emergency landing.

As this accident report shows, even a simple word or phrase used improperly or in the wrong context can cause confusion, and in this case, contribute to a tragic result.

Who Is Roy G. Biv?

If you recall from your elementary years, Mr. Biv is your friendly memory aid for the colors of the visible spectrum. These types of memory joggers, called mnemonics, are probably one of the most far-reaching and fun-to-use safety benefits of acronyms. Used by both students and experienced pilots alike, mnemonics help pilots recall checklist items and procedures. While they cannot replace published checklists, recalling critical first steps in an emergency from memory may just make a life-or-death difference. See below for some common examples.

One constant in aviation is change. With rapid technological advances, it can be challenging to stay on top of all the latest gadgets and navaids, not to mention their associated terms, phrases, and you guessed it, acronyms. Even for the veteran techno-phile, learning the ins and outs of the newest GPS systems involves expanding your acronym

Checklist Mnemonics

Required Documents
AROW – Airworthiness certificate, Registration, Operating handbook, Weight and balance and equipment list

Before Landing
GUMPS/GUMPSS – Gas (tank and/or pumps set), Undercarriage, Mixture (set), Props (set or Primer in/locked), Seatbelts, and Switches.

IFR Clearance
CRAFT – Clearance, Route, Altitude, Frequency, and Transponder

After Landing
FACTS – Flaps (retracted), Aux fuel pump (off), Cowl flaps (set), Transponder (standby), and Switches (pitot heat, lights)

Shut Down
3 Ms – Mixture (idle cut-off), Magnetos (off), and Master (off)

vocabulary regularly. And, as FAA's NextGen plan continues to roll out system changes and infrastructure enhancements, expect to see more new terms pop up, such as OCAS (Obstacle Collision Avoidance System). The cockpit is no place to start learning a new device or procedure, so be sure to allow adequate time to become familiar with terminology needed for your flight.

Fortunately, there are several sources a pilot can use to look up an unfamiliar acronym. FAA has a list of common aviation acronyms on its Web site at http://www.faa.gov/airports/resources/acronyms/. A list of NextGen acronyms can be found at: http://www.faa.gov/about/office_org/headquarters_offices/ato/publications/nextgenplan/0608/acronyms/. Many FAA publications have excellent glossaries, such as the *Aeronautical Information Manual* (AIM), *Instrument Procedures Handbook,* and the *Pilot's Handbook of Aeronautical Knowledge,* all of which can be found at: http://www.faa.gov/regulations_policies/handbooks_manuals/. And, of course, Title14 Code of Federal Regulations part 1 provides a detailed list of aviation definitions and abbreviations.

@ TEOTD (At The End Of The Day)

Acronyms are a vital part of pilot communications. Without them, reading, writing, and speaking during flight operations would be cumbersome. According to FAA's Plain Language Program Manager Bruce Corsino, acronyms can "improve efficiency and add fun to the process of description." Although they have a multitude of benefits, acronyms can also become a liability if not properly understood.

Maybe your next flight is in some unfamiliar Class B airspace that requires more radio work than you're used to. Or perhaps your aircraft has some fancy new avionics equipment that you're eager to try out. Both examples present opportunities for error if you're unfamiliar with the associated terms and abbreviations involved. So to prevent that sinking "uh-oh" moment, be sure to practice good preflight planning. If there's a term you're not familiar with, look it up, or else simply ask someone for help.

Remember to stay SAFE, because Safety Allows For Excellence!

Tom Hoffmann is associate editor of FAA Aviation News. *He is a commercial pilot and holds an A&P certificate.*

Calling All Mechanics

Keep Informed with

FAA's Aviation Maintenance Alerts

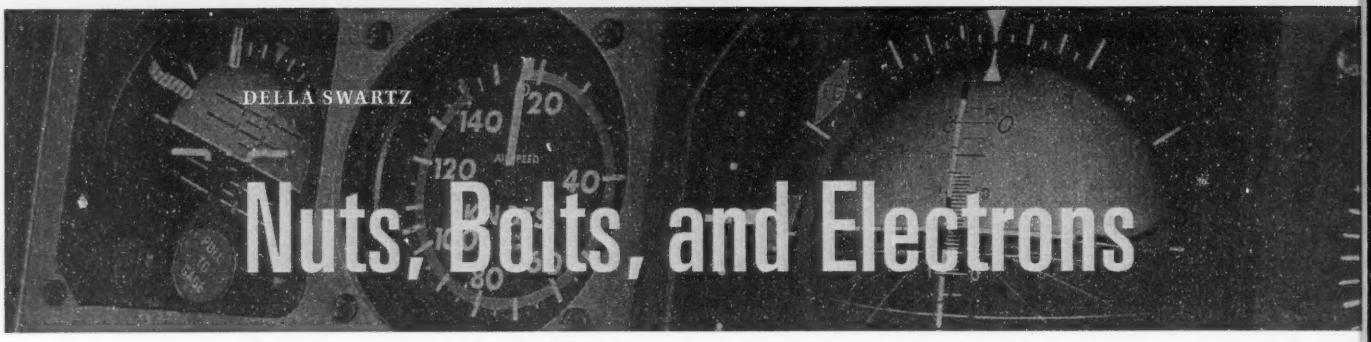
Aviation Maintenance Alerts (Advisory Circular 43.16A) provide a communication channel to share information on aviation service experiences. Prepared monthly, they are based on information FAA receives from people who operate and maintain civil aeronautical products.

The *Alerts,* which provide notice of conditions reported via a Malfunction or Defect Report or a Service Difficulty Report, help improve aeronautical product durability, reliability, and maintain safety.

Recent *Alerts* cover:

- **Cracked nose gear torque link on the Cessna 210**
- **Unsecured landing gear down-lock pin on the Diamond DA42**
- **Cracked cylinder heads on ECI Titan cylinders**

Check out *Aviation Maintenance Alerts* at:
http://www.faa.gov/aircraft/safety/alerts/aviation_maintenance/



DELLA SWARTZ

Nuts, Bolts, and Electrons

Upgrades with a Downside

There you are, setting up for landing in your beautiful taildragger, just itching to try out those new 32-inch tundra tires in combination with the previously installed six-inch extended landing gear. You spot the perfect gravel bar, touch down a little farther than expected, and apply the brakes a little hard. The next thing you know, you are hanging upside down from your seatbelt. You didn't hit the brakes all that hard.

What happened?

You have just become the victim of a supplemental type certificate (STC) incompatibility between the extended landing gear and the big tires. Now, I do not want to imply that you should never put these two modifications together. I know many people with similar combinations have been flying their airplanes for years without any problems. I'm just using it as an example of a common combination that may have unexpected effects. We'll talk more about this issue later.

When you install a gross-weight increase STC on an aircraft, all previous modifications need to be evaluated to ensure those modifications are still acceptable.

What is "STC Compatibility?"

First, as an airplane owner, why should you care about STC compatibility? Doesn't FAA think about that before issuing approvals? We do to some degree, and we list any adverse interactions we find during certification on the face of the STC. Unfortunately, FAA engineers cannot begin to predict every possible combination of STCs, field approvals, logbook entries, and repairs that might be present on a particular aircraft prior to installing the STC we are currently reviewing. That's why we put the following statement on all STCs: "Compatibility of this design change with previously approved modifications must be determined by the installer."

The type club is an excellent source for information on potential pitfalls of STC combinations.

Okay, so doesn't that mean that the aviation maintenance technician (AMT) you hired to install the STC will worry about compatibility? Of course. However, as the owner of the aircraft and the one who will have to deal firsthand with any problems due to STC compatibility, you should also be aware of the possibility and give some thought to it as well.

Things to Consider before Buying

One, does the modification affect the same structure as a previously approved modification? For example, if you are installing a heavier engine and the airplane has an extended forward baggage compartment, is the forward fuselage still strong enough to take the increased loads? Some interactions are not so obvious.

Two, does the modification affect aerodynamics/performance? Is there a previous modification that also affects aerodynamics/performance? The easiest way to approach this is to check the Airplane Flight Manual Supplement (AFMS) or Pilot Operating Handbook (POH) for the new modification against the AFMS/POH for previous installations. If there are changes to the same items between the two documents (such as climb performance or airspeeds), what will the new performance information really be with both modifications installed? Changes, such as extended wings, leading edge cuffs, and vortex generators, can react and interact with each other in unpredictable ways. This is a good example of when to talk to the STC holders and get their ideas on what should be checked. It may be the kind of thing you can do yourself on a check flight, but you may want to enlist the help of a test pilot.

Three, gross-weight increases can affect almost everything about the aircraft, such as structural loading, performance, and stability and control. If you already have a gross-weight increase on your aircraft, every future modification will need to be evaluated to be sure you are not doing something that could cause a problem. Similarly, when you install a gross-weight increase STC on an

aircraft, all previous modifications must be evaluated to ensure those modifications are still acceptable.

Lastly, installing floats affects both aircraft performance and structure. Combined with an increased gross weight, the float-equipped aircraft may have problems with buoyancy. Increased engine horsepower in combination with floats can cause issues with stability and control. If you install all three modifications—floats, increased gross weight, and increased engine horsepower—a more in-depth look at the structural and performance implications will be necessary. This is another case where talking to the STC holders is a good place to start.

Where to Find Help

1. The person who will install the STC is a great place to start. Before you even buy the STC, talk to your mechanic, inspector, or repair station about what you want to do and ask about what problems you might encounter. This advice is especially valuable if the installer has worked on your aircraft before and is familiar with its existing configuration.

2. The STC holders are most knowledgeable about the modification. They know what tests they performed and what assumptions they made. They may be able to tell you, "Yes, we tested that combination and it was fine," or, "Yes, we tested that combination and don't do it." Even if they did not test it, they may be able to give you some guidance on what aspects of their installation the previous modifications may affect as well as what areas to investigate to determine compatibility.

3. The type club is an excellent source for information on potential pitfalls of STC combinations. If you want to put two STCs on your aircraft, chances are someone else out there has already done it. Do not accept everything you read in the type club chat rooms at face value. Yet, you can get some good ideas on the types of things you should look into before spending your money on a new STC.

4. Your local Flight Standards inspectors have a great deal of experience with many different aircraft and modifications. They can help you determine what you should evaluate about the various installations to determine compatibility. They can also be a liaison with the engineers if you need to talk with the Aircraft Certification Office (ACO).

Airworthiness Directives (AD) and Repairs

Remember, if your modification is in an area with a previous repair or an AD, you need to consider the effect of the modification on the repair or AD. You may need to get an alternative method of compliance to the AD.

5. Local FAA Aircraft Certification engineers can be helpful; we like to get out of the office and look at real airplanes. We can also get in touch with the ACO that issued the STC to find out which compatibility issues were addressed during certification.

Local Aircraft Certification engineers can be helpful; we like to get out of the office and look at real airplanes.

6. If you end up with a complicated set of potential interactions, hiring a Designated Engineering Representative (DER) may be the

best option. The FAA authorizes DERs to make compliance findings. They can do the analysis or testing to show that the aircraft complies with the regulations with all of the modifications installed. If you decide to hire a DER, make sure the DER has special authorization to approve alterations.

Meanwhile, Back to the Taildragger

What do you need to think about if you want to install 32-inch tundra tires in addition to the extended landing gear? The vertical center of gravity (CG) position is higher than it was when the brake system was designed and tested. This change increases the overturning moment at the airplane CG when the brakes are applied, making it easier to flip the airplane during braking. You can check this by doing some ground tests (start off slowly!) to see if brake adjustment is needed.

Talk to your AMT about what you want to do and make sure you understand the possible issues.

In addition, the change in attitude of the airplane on the ground because of these two modifications can increase the loads on the rear longeron due to increased loads at the tail wheel. These loads may be in excess of the loads the airplane manufacturer designed the longeron to take. If the airplane also has an extended baggage compartment, the loads could be even higher. You could fly the airplane for years without a problem, or you could end up breaking the longeron during a hard landing. The only way to be sure the longeron is strong enough is to analyze it for the increased loads. You may end up needing to make an additional modification to strengthen the longeron.

The bottom line is that you are the person who will be flying the airplane. Do not assume that because someone else has the same combination of modifications installed and has been flying it that way for years that it is okay. Talk to your AMT about what you want to do and make sure you understand the possible issues. If you do not feel confident, there are places you can go for help.

Della Swartz is an aerospace engineer at FAA's Anchorage, Alaska, Aircraft Certification Office. She soloed an airplane before she learned to drive a car. She is part owner of an Aeronca Sedan.

A tail dragger equipped with tundra tires

Photo by James Williams

SUZANNE MEJIA

A Long Winter's Nap

Some of us are warm weather flyers. When the winter months come rolling in, we park our planes and head indoors, taking them out again only after the chilly weather has passed. Before you head indoors, though, let's spend a few minutes considering how best to tuck your airplane in for its long winter nap.

Process Makes Perfect

You may think that the system safety process (on the next page) is abstract and irrelevant, but aircraft storage preparation is a good way to make it come alive. In this case, our objective is to store an aircraft.

To describe the system, identify where you will you store it and for how long. If your home base does not have adequate facilities or space for storage, you may have to take your aircraft somewhere else.

Things to consider: Are you going to store the aircraft yourself, or are you going to pay a professional private or commercial aircraft storage company to do it for you? Will it be stored in a hangar or some other suitable shelter, on the ramp, or at tie-downs? If it is to be tie-downs, is the surface paved or unpaved? What type of anchor do you need? Keep in mind the weight of the aircraft and the holding power of the anchor you intend to use. FAA Advisory Circular AC 20-35C, Tiedown Sense, provides help with general tie-down techniques and procedures.

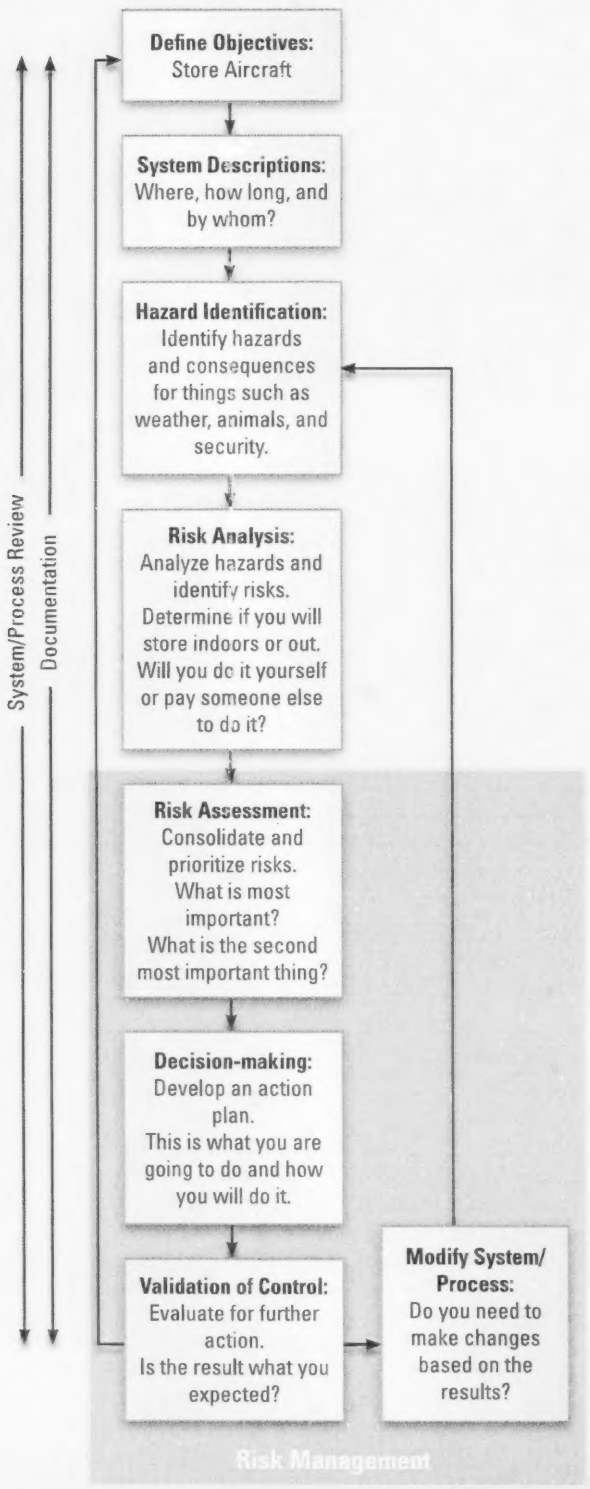
Another consideration is length of storage time. Short-, intermediate-, and long-term storage intervals can vary based on aircraft type, so check with the manufacturer for more specifics. A good example to use as a reference for storage intervals can be found in FAA Order 8900.1 (Volume 6, Chapter 2, Section 38), which defines short-term storage as a period of time less than 60 days, intermediate as 60 to 120 days, and long-term as greater than 120 days. Aircraft in short-term storage generally require extensive preservation initially, but minimum periodic attention. Intermediate storage also requires extensive preservation initially, but minimum periodic attention. Periodic inspections should include checking exterior locks, ground wires (if needed), chocks, mooring ropes, anchor points, covers, etc. Long-term storage requires extensive preservation and periodic attention. The periodic attention in this case may include start-up and running of the engine(s) for a certain amount of time. Some tasks will require you to re-preserve the aircraft.

Aircraft in short-term storage generally require extensive preservation initially, but minimum periodic attention.

Identifying and Analyzing the Hazards

The next step is to identify the hazards associated with the options. Weather may be a hazard if you are storing the aircraft outside, but animals could be a hazard in both inside and outside storage. We have all seen birds flying inside the hangar, and their nests can make a mess of your aircraft. If the aircraft is stored outdoors, consider the use of sand bags or spoiler boards for protection in high winds.

After you identify the potential hazards, you need to analyze them and identify what risks they pose. For instance, if you choose to store your aircraft yourself to save money, do you have the expertise to perform the necessary tasks? Do you have the time and opportunity to make those periodic checks on the aircraft?


System Safety Process
This process can be used for all you do.
Define Objectives: Store Aircraft
System Descriptions: Where, how long, and by whom?
Hazard Identification: Identify hazards and consequences for things such as weather, animals, and security.
Risk Analysis: Analyze hazards and identify risks. Determine if you will store indoors or out. Will you do it yourself or pay someone else to do it?
Risk Assessment: Consolidate and prioritize risks. What is most important? What is the second most important thing?
Decision-making: Develop an action plan. This is what you are going to do and how you will do it.
Validation of Control: Evaluate for further action. Is the result what you expected?
Modify System/ Process: Do you need to make changes based on the results?
System/Process Review
Documentation
Risk Management

Develop and Implement an Action Plan

Once you have identified the hazards, you must consider how to manage them. Start by prioritizing them. For example, if you decided to store your aircraft outdoors with tie-downs, your first priority will probably be to protect the aircraft from weather. How you mitigate this risk may include the use of tie-downs, gust locks, and a canvas cover to reduce the chances of damage. Your second priority may be security of the aircraft, in relation to theft. With the aircraft out for all to see, there may be little for you to do to ensure its safekeeping. However, perhaps you see that a fence around the storage area provides adequate protection, so you may decide to accept that minimal risk.

The next step is to develop a plan of action based on the risk assessment that you performed. This plan spells out the "what" and the "how." Once the plan is implemented, you need to validate it by determining if it worked as you expected, and if it covered all the risks. There may well be hazards that you did not recognize or identify during the first effort. For instance, in the example above, you decided that the airport fence mitigates the security hazard. Later, however, you discover that someone has broken into your aircraft. You conclude that you need to modify your arrangements in some way in order to better mitigate the security risk. The flow chart shows how you might use the risk management process to rethink this issue and try again.

Am I Airworthy?

Depending on the length of storage and the security of the aircraft, you may want to consider removing the airworthiness and registration certificates from the stored aircraft for safekeeping. However, be sure to reinstall those items in the aircraft once you're ready to take it out of storage. Also, don't forget that all time accrued while an aircraft is in storage must be counted in order to determine what maintenance items are due prior to returning the aircraft to service.

Tips and Techniques

Here are some specific additional tips to consider when preparing your aircraft for storage. Bear in mind, that different aircraft have different storage requirements. Always consult the

Photo by James Williams

An example of a winterization plate

manufacturer's instructions for each make and model. A few basic points to consider, though, include the following:

- Disconnect aircraft batteries, and remove regular batteries to prevent damage to the aircraft.
- Clean the aircraft before you cover it.
- Consider preservative or corrosion treatment, paying special attention to unpainted surfaces that are susceptible to corrosion
- Invest in quality covers. Covers help protect the aircraft from dust, dirt, water, etc. Covers may need to have drainage holes at locations where water would tend to accumulate. If you are using pressure-sensitive tape make sure you don't attach it directly to acrylic or polycarbonate canopies and windscreens.

Suzanne Mejia is an airworthiness safety inspector and course manager for the Airworthiness Branch of the FAA Academy.

The FAA Wants You!

Attention pilots, mechanics, and avionics technicians:

Here is your opportunity to start a career in the exciting field of aviation safety. The FAA's Flight Standards Service is currently hiring aviation safety inspectors and is seeking individuals with strong aviation backgrounds in maintenance, operations, and avionics. Starting salaries range from $40,949 to $77,194, plus locality pay. Benefits include federal retirement and tax-deferred retirement accounts and health insurance.

Qualifications vary depending on discipline. For details, please visit http://jobs.faa.gov/. Under "All Opportunities" you can search by job series 1825 or title containing "inspector."

Start your application today.

MICHAEL ALBERTS

THE MIGHTY

MIDO? What on earth is a MIDO? Great question. I am here to tell you that a "MIDO" is an FAA Manufacturing Inspection District Office.

A MIDO is home to some 145 manufacturing-aviation safety inspectors (ASI) across the nation. As pilots and aviation maintenance technicians (AMT), you're probably more familiar with our brothers and sisters in the Flight Standards District Offices (FSDO). Here in the MIDO, we work closely with civil aviation manufacturers in order to ensure that the aircraft, engines, propellers, appliances, and parts that you install on your aircraft are manufactured according to the regulations and the FAA-approved type design data. The work we do is instrumental in making sure these products are airworthy and in a condition for safe operation. Here's the scoop.

MIDOs work closely with manufacturers to ensure that aircraft, engines, propellers, appliances, and parts are manufactured to FAA-approved type design data.

What a MIDO Does

MIDOs are directly responsible, in whole or in part, for production certification and approvals, certificate management, and continued operational safety aspects of the production approval holders. We are also responsible for original airworthiness certification, suspected unapproved parts investigations, designee management, and a host of not-so-obvious activities. These activities include accident investigation, regulatory compliance, and enforcement. Additionally, we provide support to foreign civil aviation authorities, assist with drafting regulation and policy, and participate in public events and outreach programs. Quite frequently, we assist the Aircraft Certification Offices (ACO) with type or supplemental type certification and we evaluate quality systems and oversee holders of a technical standard order authorization.

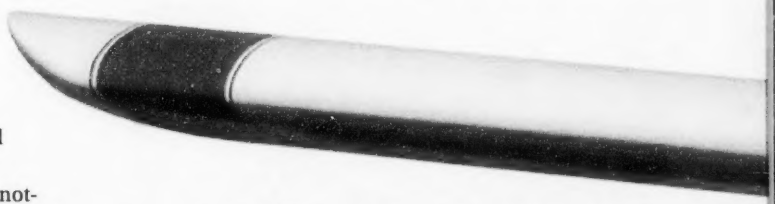
How does all this work get accomplished by only 145 manufacturing ASIs staffing the MIDOs?

That's another great question. The one-word answer is delegation. FAA may appoint private persons to act as representatives of the Administrator in examining, inspecting, and testing aircraft (and parts) for the purpose of issuing aircraft certificates. Each MIDO appoints and supervises an extensive designee workforce comprised of qualified individuals. Manufacturing designees may be authorized to perform certain airworthiness functions and to exercise those functions under the direct supervision of the geographically responsible MIDOs.

What a MIDO Does for You

Back to the original question: What can a MIDO do for you?

Have you ever been interested in building your own aircraft? Or, have you had an idea on how to improve the performance or reliability of your aircraft and wanted to design, produce, and sell



those modified or replacement parts? That's where we can help. Amateur-built aircraft certification, supplemental type certification, or the issuance of a parts manufacturer approval is where we most often interface with individual pilots or AMTs.

MIDO

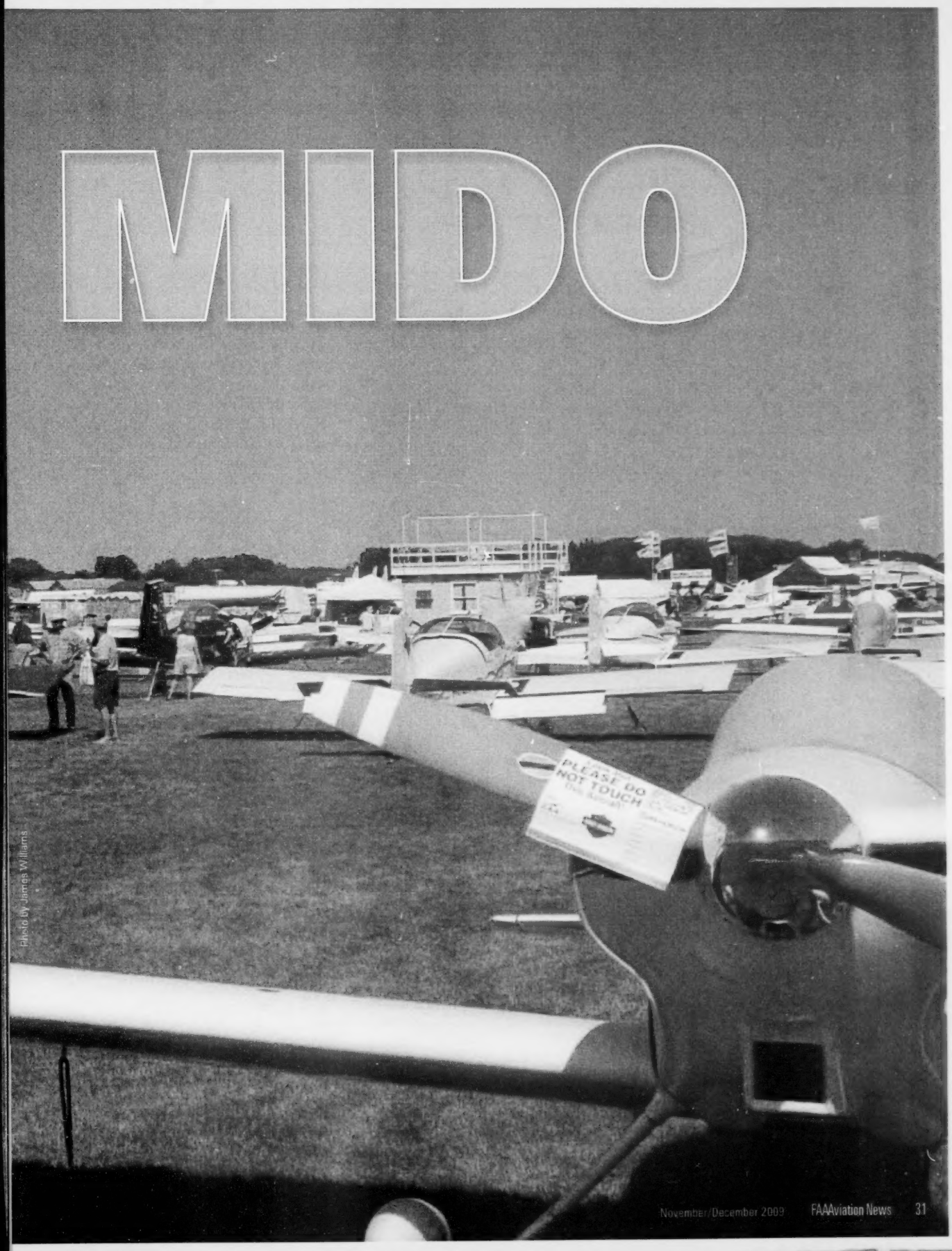


Photo by James Williams

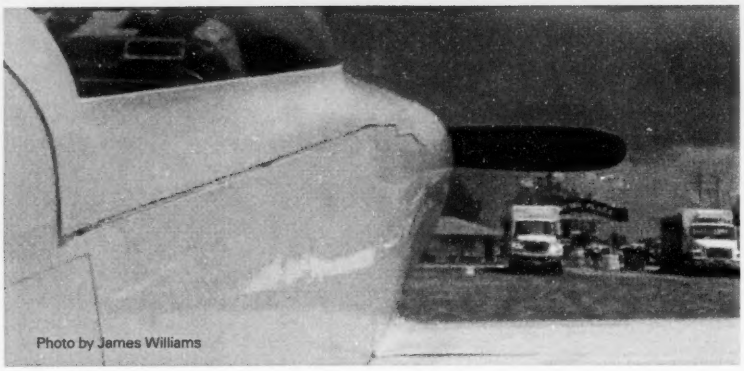


Photo by James Williams

Amateur-built Aircraft

Amateur-built regulations allow, in fact encourage, an aviation enthusiast interested in constructing an aircraft solely for personal education or recreation to pursue that interest and passion (Title 14 Code of Federal Regulations section 21.191(g)). FAA encourages amateur-building, too. Each year you'll see manufacturing ASIs staffing the FAA booths located on grounds at various fly-ins, such as the Experimental Aircraft Association (EAA) AirVenture® and Sun 'n Fun®.

We're extremely grateful for the Wright brothers. After all, it was their passion and inspiration that produced one of the first successfully flown amateur-built aircraft in the United States. Today, tens of thousands of amateur-built aircraft fly throughout the world. Does this interest you? Would you like to know more about the certification and operation of amateur-built aircraft? Check out Advisory Circular No.20-27E, Operations and Certification of Amateur-built Aircraft.

Supplemental Type Certificates (STC)

I mentioned that MIDO employees assist ACOs with the type or supplemental type certification process. One of my favorite ASI duties is working with an STC applicant who has a great idea about how to improve upon a type certificated design. As covered in other articles, an STC is FAA's approval of a major change in the type design of a previously type-certificated product. We have the responsibility to conform detail parts, sub-assemblies, major assemblies, installations, test set ups and, of course, aircraft or engines and propellers that are eventually flight tested to show compliance with applicable regulations. An STC reflects FAA design approval and is often used as a basis for obtaining a parts manufacturer approval. Are you one of these folks with a bright idea? Want to know more about obtaining an STC? Check out Advisory Circular No. 21-40A, Guide for Obtaining a Supplemental Type Certificate.

Have you ever been interested in building your own airplane? This is where a MIDO can help.

Parts Manufacturer Approval (PMA)

It's not just the manufacturers or suppliers with a large workforce who apply for a PMA. Each year, we evaluate PMA applications from individual pilots or AMTs who designed a gizmo, gadget, or system for their aircraft. In keeping with the spirit of the American entrepreneur, these folks often recognize a market for their product and therefore pursue the PMA so that they may manufacture, apply PMA part marking, and sell their product to anyone interested in installing the parts onto a type-certificated aircraft, engine, or propeller. Perhaps you've seen some of these aileron hinges, camera pods, wheel pants, cockpit illumination devices, floats and skis, actuators, or oil cooler systems.

It's a Team Effort

The MIDO bears many significant responsibilities and performs multiple tasks, all aimed at helping keep you safe. Our ASI workforce has a diverse professional background, education, and experience. We may be AMTs or pilots or hold inspection authorizations (IA) ourselves. Some of us served in the military where we gained an aviation education. Some of us acquired years of experience working for an aviation manufacturer, building, inspecting and testing aircraft, engines, propellers, or appliances. Sound familiar? We're just like many of you.

We're committed to do our part to provide the world's safest aerospace system. Now, what can we do for you?

Michael Alberts is the manager of the Kansas City MIDO, Kansas City, Missouri.

For More Information

The FAA's Web site at
http://www.faa.gov

provides a search option that you can use to locate contact information for most FAA field offices, including FSDOs and MIDOs.

For regulatory and advisory information referenced in this article, go to the Regulatory Guidance Library at
http://rgl.faa.gov.
All references to regulations are in reference to Title 14 Code of Federal Regulations (CFR).

LISA BACON

Exploring Aviation *and* Space Careers

Will America have enough "next generation" aerospace engineers? FAA and the American Institute of Aeronautics and Astronautics (AIAA) are working together to make sure that the answer to that question is an unequivocal "yes."

FAA and AIAA have a long history of collaborating on technical issues affecting the aerospace industry. In recent years, this partnership has grown to include inspiring educators and students to explore aviation and space, with FAA helping energize AIAA's various educational programs. Here are just a few examples.

Education Alley

For several years, FAA has participated in the highly successful "Education Alley" program at the annual AIAA SPACE Conference. Billed as the ultimate field trip, Education Alley has touched thousands of students in Southern California and Houston with special hands-on exhibits for students; presentations by astronauts, researchers, industry representatives,

FAA's Smart Skies demonstrations, with an online air traffic control simulator, have been especially popular.

and educators; and tours of the conference's main industry exhibit hall. These activities enable students to see and do things they could only imagine. FAA's Smart Skies demonstrations, with an online air traffic control simulator, have been especially popular.

Ask Polaris

James Brough, manager of the FAA's National Aviation and Space Education Program, participated in a task force to produce a collaborative Web site, "Ask Polaris," for students considering an aerospace engineering major in college (www.askpolaris.org).

Featuring contributions from AIAA, FAA, Aerospace Industries Association (AIA), and the Junior Engineering Technical Society (JETS), Ask Polaris has a section for students to learn about aerospace engineering as a major and as a career, and a section for parents to learn about college choices and how to fund a college education.

The goal is straightforward: Inspire the future aerospace workforce.

Passport to the Future

Representatives from the FAA education program participated in the "Passport to the Future" Teacher Workshop in Denver in August 2009, sponsored by Lockheed Martin. The workshop enabled educators to interact with industry professionals as they attended hands-on sessions and networking events as well as to get pointers on how best to inspire their students to aim for the stars. Highlights of this workshop included a keynote speech by Dr. Mark Lewis, former Chief Scientist of the Air Force, and a networking evening with astronaut Bruce McCandless.

Educator Membership and Awards

FAA also played a key role in this year's AIAA Foundation Educator Achievement Award trip to Washington, DC, and hosted tours of the FAA's air traffic control tower at Ronald Reagan Washington National Airport and the FAA's Air Traffic Control System Command Center in northern Virginia. These trips allowed the K-12 teachers, who received the award, to see potential career opportunities for their students in aviation and air traffic control.

Educators participating in FAA programs are also welcome to take advantage of the free AIAA Educator Associate membership to further enhance their classroom resources. Please visit the AIAA Web site at www.aiaa.org and click on Students & Educators to see the various resources available to teachers and students.

The goal is straightforward: Inspire the future aerospace workforce. For information about FAA programs, contact James Brough at James.Brough@faa.gov. For information about AIAA programs, contact Lisa Bacon at lisab@aiaa.org.

Lisa Bacon is the K-12 program manager at the American Institute of Aeronautics and Astronautics.

Flight Forum

Medical Requirements

What class of medical is a CFI required to maintain?

—Name Withheld

In most situations, a third-class medical certificate is all that is needed to instruct. Title 14 Code of Federal Regulations (CFR) section 61.23 clarifies what operations can be conducted while holding each class of medical certificate as well as what operations can be conducted when not holding a medical certificate. Title 14 CFR section 61.23(a)(3)(iv) states that a person must hold at least a third-class medical certificate when exercising the privileges of a flight instructor certificate, except for a flight instructor certificate with a glider category rating, if the person is acting as pilot in command, or is serving as a required flight crew member. Also, 14 CFR 61.23(b)(5) requires that a person is not required to hold a medical certificate when exercising the privileges of a flight instructor certificate if the person is not acting as pilot in command, serving as a required pilot flight crewmember, or instructing in gliders. You may find more information in the Aircraft Owners and Pilots Association (www.aopa.org) subject report, "What Medical Is a CFI Required to Maintain?".

On the Radio

Are pilots still required to carry a Restricted Radiotelephone Operator Permit? My last one is dated in 1970 and I'm just wondering. Also, is it required to have a Ship/Aircraft Radio Station License on board the aircraft?

—Bill Dayton

The Restricted Radiotelephone Operator Permit is no longer required. The Federal Communications Commission (FCC) eliminated the individual licensing requirement for all aircraft, including scheduled air carriers, air taxis, and general aviation aircraft operating domestically. According to the FCC, this means that you do not need a license to operate a two-way VHF radio, radar, or ELT aboard aircraft operating domestically. All other aircraft radio stations must be licensed by the FCC either individually or by fleet. These are the aircraft that are required to have the Aircraft Radio Station License. For more information, go to www.fcc.gov.

By the way, for those who do have a Restricted Radiotelephone Operator Permit, it is issued for the holder's lifetime, so yours is still good.

FAA Aviation News *welcomes comments. We may edit letters for style and/or length. If we have more than one letter on the same topic, we will select one representative letter to publish. Because of our publishing schedules, responses may not appear for several issues. We do not print anonymous letters, but we do withhold names or send personal replies upon request. Readers are reminded that questions dealing with immediate FAA operational issues should contact their local Flight Standards District Office or Air Traffic facility. Send letters to: Editor, FAA Aviation News, AFS-805, 800 Independence Avenue, SW, Washington, DC 20591, or FAX them to (202) 267-9463, or e-mail them to AviationNews@faa.gov.*

Got Medical Questions? We've Got Answers!

Do you have any medical questions or concerns you've been yearning to have addressed? Maybe you're concerned about what's needed for a special issuance certificate. Or, perhaps you're curious about a new prescription or about how an upcoming operation may affect your "fitness for flight."

In 2010, we plan to start a regular column on Medical Certification. Send your question to *FAA Aviation News* and we will forward it—from us **without** your name attached—to Dr. Warren Silberman, manager of FAA's Aerospace Medical Certification Division. We'll publish Dr. Silberman's answer, which will pertain to anyone with that medical situation/concern. All questions will be kept anonymous. Please send your questions to: AviationNews@faa.gov.

SUSAN PARSON

Editor's Runway

Ice PIC

There was a time when I was timid. My siblings still relish the story of how "scaredy-cat Susan" was too shy to speak up at the fast food counter, leaving my younger sister to order for us both. I could argue that delegation of speaking authority was an early indication of my prowess with crew resource management (CRM), but you wouldn't believe it any more than they do. The reality is that I was a mouse.

Of Mice and Ice

One of the first things I learned about flying, though, is that the left seat is no place for a mouse. Being pilot in command (PIC) means being in charge. In fact, the regulations state very clearly that the PIC is the final authority on safe operation of the flight. That is true at all times, but with winter upon us, I'll focus on how the PIC must use that authority to escape any encounter with freezing precipitation.

The PIC must use that authority to escape any encounter with frozen (or freezing) precipitation.

It is no sign of timidity to avoid ice in the first place. As Meredith Saini writes on page 9, the best plan is to find the ice before it finds you and, as the saying goes, use superior judgment to avoid situations that require any exercise of superior pilot skills. If your avoidance methods fail, though, your top priority is to get out of icing conditions as quickly as you can. The worst thing you can do is to forge ahead hoping it will improve.

If avoidance methods fail, though, your number one priority is to get out of icing conditions as quickly as you can.

Know before You Go

I can recall three flying occasions when ice surprised me—in part because each occurred in the spring. The first time, I was headed to Sun 'n Fun in my club's Cessna *Skylane* with a fellow pilot. He was the first to notice rime ice forming on the struts. Here's where it helps to be prepared: I already knew that a 1,000 foot descent would put us below the cloud bases, and that there was no hazardous terrain at that altitude. I told ATC that we needed an immediate descent, and we got it.

The second time, I was flying a Piper *Aztec* with friends when an icy patch of cloud made the windshield instantly opaque. With hills below, my request to ATC was for an immediate 180-degree turn. Once out of danger, we were able to find an ice-free alternate route to our destination.

The third time was in a Cessna *Stationair* over New Mexico. We had several options: A 1,000-foot climb would put us above the tops, and a 30-degree course change would put us completely in the clear. Having just crossed the beacon marking a lower MEA, we also had the option of descending to warmer air. We told ATC that we could take anything but status quo, and the controller immediately approved a descent.

In each of these cases, the key to safe flights and happy landings was situational awareness, multiple options, and willingness to use them right away. Happy holidays!

Susan Parson is a special assistant in the FAA's Flight Standards Service. She is an active general aviation pilot and flight instructor.

LYNN MCCLOUD

FAA Faces

Mel Cintron, A Man with a Mission

There's a new face in room 835 at FAA headquarters in Washington, DC. This fall, Mel Cintron joined the General Aviation and Commercial Division as division manager. Cintron oversees the FAA Flight Standards Service division that develops regulations and recommends policy for general aviation. It also produces *FAA Aviation News*.

Cintron describes the division's work as providing "the foundation of aviation." Indeed it does. The division, known in FAA shorthand as AFS-800, is the governmental gateway for airmen. "We are responsible for overseeing the training, testing, and checking of airmen," says Cintron, "to ensure we have sound standards and mechanisms in place to assure the standards are met." The division does this by developing regulations and policy recommendations for the certification, inspection, and surveillance of pilots, instructors, and designated pilot examiners. For example, the division was responsible for the recent revisions to flight training regulations, which, among other things, established training and qualification requirements for pilots and flight instructors who use night vision goggles and clarified the use of training devices and flight simulators for maintaining recent instrument experience.

As for involvement across GA, consider this: The division oversees policy concerning aerial applicators and air shows, balloons and banner towing, as well as fractional ownership, rotorcraft external-load operations, and warbirds. The aircraft can be as small as a powered parachute or as large as a Boeing 747.

"I'm proud of the work we do in AFS-800," says Cintron, "and I'm excited to be here because what we do makes a very real difference. GA safety has been improving—annual fatalities have been declining—and that's what motivates everyone in our division: Making GA safer and saving lives."

Cintron knows firsthand about saving lives. His aviation experience started in the U.S. Army where he was trained as an A&P. He was a combat/flight medic in the first Gulf War in 1991. After that service, he returned to the states and worked in Florida at Miami Helicopter Services before joining the FAA in 1995 as an aviation safety inspector (ASI) at the Fargo, North Dakota FSDO. "With my operational experience," Cintron explains, "I thought I could work on the regulatory side for a few years and then return to private industry."

That return never happened. "I never looked back. I was hooked on the FAA's role to improve aviation safety," Cintron adds, "and I believed in serving my country in the Army Reserve."

From Fargo, Cintron moved to Frankfurt, Germany, where he served as a principal maintenance inspector in the FAA International Field Office. In 2002, Cintron came to headquarters to be deputy division manager of the International Programs and Policy Division (AFS-50).

In 2005, Cintron began a second stint in Iraq as aviation maintenance officer of the Army's 1159th Medical Evacuation Company. His mission: Assure combat readiness of the 1159th in the dangerous Sunni Triangle. His unit flew 4,600 hours and 2,400 missions in under a year, transported 3,900 wounded/patients, and delivered blood and other medical supplies. The unit's readiness rate: 93 percent, well above the Army standard of 75 percent. This dedication, leadership, and "holding myself and my unit accountable" earned Cintron a Bronze Star.

Cintron describes the division's work as providing "the foundation of aviation."

On returning to FAA in 2006, Cintron became manager of AFS-50, where he served before joining AFS-800. Cintron holds a commercial pilot certificate—rotorcraft/helicopter, private pilot privilege airplane single engine land—and an A&P with Inspection Authorization. "I'm excited about dealing with policy issues and working with my experienced staff," Cintron says. "I also plan to go to some area airports, get some flying time, and become better acquainted with our practical test standards."

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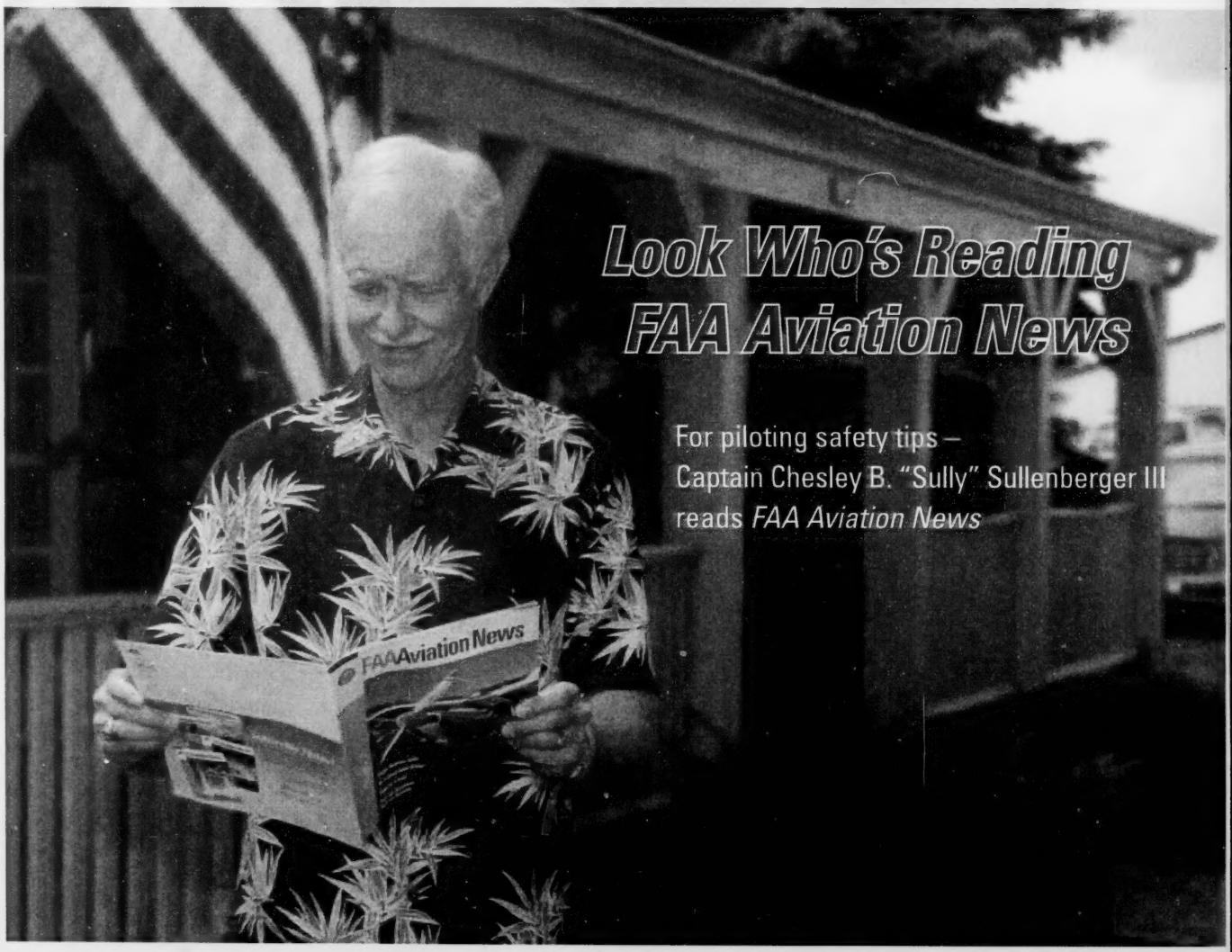

Look Who's Reading FAA Aviation News

For piloting safety tips –
Captain Chesley B. "Sully" Sullenberger III
reads *FAA Aviation News*

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